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Prevalence of Sexual Dysfunction in Females Suffering from Depression in a Tertiary Care Centre in Western U.P.

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Abstract

Background: There is a need to explore the sexual functioning of women with depression as one part of sexuality is that it helps in developing an intimate emotional and physical relationship with another person, and this relationship may serve as a buffer against life stresses. Our aim was to study the prevalence and types of sexual dysfunction in depressed women patients and to compare them with non-depressed women.

Materials and Methods: A total of 270 participants who attended a teaching hospital were selected for the study – 135 cases and 135 controls. Sociodemographic and clinical details were collected. Mini International Neuropsychiatry Interview (M.I.N.I), Hamilton Depression Rating Scale (HAM-D), Arizona Sexual Experiences (ASEX) scale, and Female Sexual Functioning Index (FSFI) scale were used. Sexual dysfunction was assessed in both groups.

Results: Among the cases, 47.40% had mild depression, 44.44% had moderate depression, and 8.15% were severely depressed. On the ASEX, 46.66% of the cases had sexual dysfunction, while it was only 8.89% among the controls. The difference in sexual dysfunction among cases and controls was statistically significant. Using the FSFI, 40% of the cases had female sexual dysfunction (FSD), and it was only 11.1% in controls.

Conclusion: Sexual dysfunction was more common in females with clinical depression than in those without depression. Numerous factors can operate in the causation of FSD. This study underlines the importance of screening females with depression for FSD, for its early diagnosis and management.

Keywords: Depression, sexual dysfunction, women

Introduction

Depression is a common disorder and is mainly characterized by depressed mood, decreased energy, and loss of interest in previously pleasurable activities. Sexual dysfunctions are "impairments in the sexual response cycle or the presence of pain associated with sexual intercourse."[1] The prevalence of female sexual dysfunction (FSD) in Western countries is reported to be between 17% and 55%. FSD is considered a multidimensional entity with various biological and psychosocial dimensions.[2] FSDs can occur in the

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form of Hypoactive sexual desire disorder (HSDD), sexual aversion disorder, female sexual arousal disorder, female orgasmic disorder, dyspareunia, and vaginismus. Furthermore, there are newer disorders identified recently, such as persistent genital arousal disorder.

The risk factors for sexual dysfunction include age, education level, emotional ill health and stress, and sexual abuse.[3] Pregnancy also plays a role in sexual dysfunction. The sexual functioning is considerably lower in the last trimester of pregnancy.[4] In a study, middle-aged women of 40–65 years with a lower socioeconomic and lower level of education showed the highest rates of FSD.[5] A study from Brazil reported that the prevalence of sexual dysfunction was 28% and 49%, respectively, in females across selected social groups. The prevalence rate was between 18% and 29.3% for female orgasmic disorder and 26.7% for HSDD.[6,7] Furthermore, the study also showed that women seeking professional help for sexual disturbances were only 18.8%.[8] FSD is physically disconcerting, emotionally distressing, and socially disruptive for those who suffer from it.[9]

A few earlier studies have suggested that depression increases the risk for the development of FSD. In women who had depression, HSDD was reported to be the most common type of FSD.[10] The chief complaint of patients with depression may include loss of sexual desire, and conversely, the presence of lower sexual desire may lead to depression. A few studies have shown that FSD was more common in depressed women than in patients with no depression.[11] The loss of sexual desire was found to have greater prevalence than disorders of arousal or orgasm, and in other studies, HSDD was the most prevalent in depressed patients.[12] The Study of Women's health Across the Nation (SWAN), in the United States, showed recurrent depression to be associated with reduced arousal and pleasure.[13] Yet, depressed female patients are very reluctant to talk about sexual dysfunction even when they are in the hospital for the treatment of depression.

There is a paucity of studies in India on FSD. FSD is also one of the grossly underreported health conditions in India due to various social and cultural taboos. There is a further reduction in the interest

and desire for sexual activities with the partner when clinically depressed. Increase in depression is leading to increased prevalence of HSDD as part of depressive symptomatology.[14] Yet, like the women from the United States who were part of SWAN study, this dual malady is probably silently suffered by Indian women too. We undertook the study to determine whether sexual dysfunction in those with depression was more when compared with those without depression, using ASEX and FSFI.

Materials and Methodology

This hospital-based, cross-sectional comparative study was conducted at a Medical College Hospital between January 2021 and December 2021. Female patients who attended the Psychiatry outpatient (OP) of the tertiary care teaching hospital were approached for the study.

Using a previous Indian study by Roy *et al.*, the expected proportion of women with FSD was considered as 70.3% among people with depression and 43.3% among women without depression.[15] Power of study at 90% and two-sided alpha error of 5% yielded a sample size of 119. Allowing for an additional 10% excess, a final sample size of 135 in each group was arrived at.

Purposive sampling was used to select patients who received a diagnosis of mild, moderate, or severe depressive episode as per International Classification of Diseases, Tenth Revision (ICD-10). Both new and follow-up cases were included. The inclusion criteria for cases included women age 18–45 years who are sexually active, attended the psychiatric OP department, are diagnosed with depression, are with or without anti-depressant medications, and are willing to give consent to participate in the study. The exclusion criteria included reporting menopausal symptoms and having serious medical comorbid conditions that required hospitalization more than once in the past.

Observations and Results

A total of 281 females were approached for the study purpose. Eleven females were excluded from the study as they had menopausal symptoms. Four out of these 11 perimenopausal females had reported

to be sexually inactive. Finally, a total of 135 females with depression and 135 females in the control group were studied. The mean age ± SD was 32.09 ± 5.68 years in the cases and 32.04 ± 5.58 years in the control group. The majority were housewives, were from middle socioeconomic status, had completed schooling, were Hindu by religion, and were from semi-urban domicile. The case and control groups did not show any statistically significant difference in the above-mentioned demographic data.

We assessed severity of depression using the HAM-D. Severe depression was seen in 8.15% of the cases. The proportion of cases with mild depression was 47.40%, while 44.44% had moderate depression. The mean ASEX score was 19.6 ± 4.65 in the cases, while it was 15.27 ± 4.13 in the controls. This mean difference was statistically significant (t = 4.33, 95% CI, P < 0.001).

Poor sex drive was reported in 64.8% (n = 87) of cases. Difficulty in sexual arousal and lubrication difficulty was reported by 54.8% (n = 74) and 68.9% (n = 93), respectively. Difficulty in reaching orgasm was seen in 71.9% (n = 97) of the cases, and 69.7% (n = 94) reported unsatisfying orgasms. The severity of depression was associated with sexual dysfunction, which was statistically significant (χ^2 = 68.03, df = 24, P = 0.000).

The mean FSFI rating scale score was 27.79 ± 3.38 in cases, and it was 31.09 ± 3.65 in controls. The difference was statistically significant (t = 3.30, 95% CI, P < 0.001). In our study, according to the FSFI rating scale, 40% of the cases had FSD and it was only 11.1% in controls

In this study, 22.22% of the cases had a positive history of antidepressant medication, while only 7.4% among the controls had a positive history of any medication use. This difference in proportions among cases and controls was statistically significant. There was a statistically significant difference between the cases and the control group with respect to the use of medicines and FSD (χ^2 = 11.73, df = 1; P = 0.001). In cases who had positive current medication history (n = 30), FSD was reported in 20%.

Discussion

FSD is one of the underdiagnosed disorders across the world and especially in developing countries like in India with complex cultural barriers and taboo regarding an open discussion about sexual health. Across the world, it is often underreported or underdiagnosed compared with male sexual dysfunction.[23] The prevalence of FSD in non-depressed women reported in Indian studies varies from 33.3% to 73.2%.[24,25] The varying rates were reported to be due to vastly different study samples, methodological differences, and cultural variations in sexual practice in India.[25] Even fewer studies have been done on FSD in women who are depressed.

This study was done to assess sexual dysfunction in females with depression. A total of 135 cases of depression and 135 age-matched controls were studied. A statistically significant difference was observed in sexual dysfunction between cases and controls.

The mean age of the study population was 32 years in both groups. Sexually active married women formed the majority (77.03%) of the study sample. The baseline parameters of our study sample were comparable with that of Sreelakshmy et al.[26] Roy et al.[17] and Kendurkar et al.[27]

In our study, the mean ASEX score was more in cases than in controls, and the difference was statistically significant. As per ASEX, 46.66% of our cases had SD, while only 8.89% of controls had SD. This difference in SD among the cases and controls was statistically significant. Our finding was consistent with the study done by Roy et al.[17] who observed that on ASEX scale, 73.3% of participants were showing sexual dysfunction in the study group, but it was only 20% in the controls. As in our study, the difference in proportion between cases and controls was statistically significant.

Conclusion

Our study is an attempt to address the often-neglected area of FSD in depressed females, done at a tertiary care teaching hospital. Even though the study

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sample contained mostly of patients with mild and moderate depression, women with depression had significantly higher sexual dysfunction.

Sexual functioning and dysfunction are still a sensitive and stigmatized area, even among educated adult females. Though they seek treatment for somatic and psychological symptoms of depression, adult females are hesitant to seek out help for sexual dysfunction. This study underlines the importance of screening depressed female patients for sexual dysfunction.

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References

1. Leiblum R, Sharon GN, Sandra Persistent sexual arousal syndrome: A newly discovered pattern of female sexuality. J Sex Marital Ther. 2001;27:365–80. [PubMed] [Google Scholar]

2. Abhivant N, Sawant N. Sexual dysfunction in depressed Indian women attending a hospital out patient department in Mumbai. Sri Lanka J Psychiatry. 2013;4:10–3. [Google Scholar]

3. Laumann EO, Paik A, Rosen RC. Sexual dysfunction in the United States: Prevalence and predictors. JAMA. 1999;281:537–44. [PubMed] [Google Scholar]

4. Leite AP, Campos AA, Dias AR, Amed AM, De Souza E, Camano L. Prevalence of sexual dysfunction during pregnancy. Rev Assoc Med Bras. 2009;55:563–8. [PubMed] [Google Scholar]

5. Valadares AL, Pinto-Neto AM, Osis MJ, Sousa MH, Costa-Paiva L, Conde DM. Prevalence of sexual dysfunction and its associated factors in women aged 40-65 years with 11 years or more of formal education: A population-based household survey. Clinics (Sao Paulo) 2008;63:775–82. [PMC free article] [PubMed] [Google Scholar]

6. Prado DS, Mota VP, Lima TI. Prevalence of sexual dysfunction in two women groups of different socioeconomic status. Rev Bras Ginecol Obstet. 2010;32:139–43. [PubMed] [Google Scholar]

7. Abdo CH, Oliveira Jr WM, Moreira Jr ED, Fittipaldi JA. Prevalence of sexual dysfunctions and correlated conditions in a sample of Brazilian women—Results of the Brazilian study on sexual behavior (BSSB) Int J Impot Res. 2004;16:160. [PubMed] [Google Scholar]

8. Moreira Jr ED, Brock G, Glasser DB, Nicolosi A, Laumann EO, Paik A, et al. GSSAB Investigators' Group.Help-seeking behaviour for sexual problems: The global study of sexual attitudes and behaviors. Int J Clin Pract. 2005;59:6–16. [PubMed] [Google Scholar]

9. Basson R, Berman J, Burnett A, Derogatis L, Ferguson D, Fourcroy J, et al. Report of the international consensus development conference on female sexual dysfunction: Definitions and classifications. J Urol. 2000;163:888–93. [PubMed] [Google Scholar]

10. Fabre LF, Smith LC. The effect of major depression on sexual function in women. J Sex Med. 2012;9:231–9. [PubMed] [Google Scholar]

11. Phillips JR, Slaughter JR. Depression and sexual desire. Am Fam Physician. 2000;62:782–6. [PubMed] [Google Scholar]

12. Casper RC, Redmond DE, Katz MM, Schaffer CB, Davis JM, Koslow SH. Somatic symptoms in primary affective disorder: Presence and relationship to the classification of depression. Arch Gen Psychiatry. 1985;42:1098–104. [PubMed] [Google Scholar]

13. Cyranowski JM, Bromberger J, Youk A, Matthews K, Kravitz HM, Powell LH. Lifetime depression history and sexual function in women at midlife. Arch Sex Behav. 2004;33:539–48. [PubMed] [Google Scholar]

14. Rao TS, Darshan MS, Tandon A. An epidemiological study of sexual disorders in south Indian rural population. Indian J Psychiatry. 2015;57:150. [PMC free article] [PubMed] [Google Scholar]

15. Roy P, Manohar S, Raman R, Rao TS, Darshan MS. Female sexual dysfunction: A comparative study in drug naive 1st episode of depression in a general hospital of South Asia. Indian J Psychiatry. 2015;57:242. [PMC free article] [PubMed] [Google Scholar]

16. Sheehan DV, Lecrubier Y, Sheehan KH, Amorim P, Janavs J, Weiller E, et al. The Mini-International Neuropsychiatric Interview (MINI): The development and validation of a structured diagnostic psychiatric interview for DSM-IV and ICD-10. J Clin Psychiatry. 1998;59(Suppl 20):20–2. [PubMed] [Google Scholar]

17. Hamilton M. A rating scale for depression. J Neurol Neurosurg Psychiatry. 1960;23:56. [PMC free article] [PubMed] [Google Scholar]

18. McGahuey A, Gelenberg AJ, Laukes CA, Moreno FA, Delgado PL, McKnight KM, et al. The Arizona sexual experience scale (ASEX): Reliability and validity. J

Sex Marital Ther. 2000;26:25–40. [PubMed] [Google Scholar]

19. Brown RC, Heiman J, Leiblum S, Meston C, Shabsigh R, Ferguson D, et al. The Female Sexual Function Index (FSFI): A multidimensional self-report instrument for the assessment of female sexual function. J Sex Marital Ther. 2000;26:191–208. [PubMed] [Google Scholar]

20. Lecrubier Y, Sheehan DV, Weiller E, Amorim P, Bonora I, Sheehan KH, et al. The Mini International Neuropsychiatric Interview (MINI). A short diagnostic structured interview: Reliability and validity according to the CIDI. Eur Psychiatry. 1997;12:224–31. [Google Scholar]

21. Sheehan DV, Lecrubier Y, Sheehan KH, Amorim P, Janavs J, Weiller E, et al. The Mini-International Neuropsychiatric Interview (MINI): The development and validation of a structured diagnostic psychiatric interview for DSM-IV and ICD-10. J Clin Psychiatry. 1998;59(Suppl 20):22–33. [PubMed] [Google Scholar]

22. Bech P. Rating scales in depression: Limitations and pitfalls. Dialogues Clin Neurosci. 2006;8:207–15. [PMC free article] [PubMed] [Google Scholar]

23. Verma KK, Khaitan BK, Singh OP. The frequency of sexual dysfunctions in patients attending a sex therapy clinic in north India. Arch Sex Behav. 1998;27:309–14. [PubMed] [Google Scholar]

24. Varghese KM, Bansal R, Kekre AN, Jacob KS. Sexual dysfunction among young married women in southern India. Int Urogynecol J. 2012;23:1771–4. [PubMed] [Google Scholar]

25. Singh J, Tharyan P, Kekre NS, Singh G, Gopalakrishnan G. Prevalence and risk factors for female sexual dysfunction in women attending a medical clinic in south India. J Postgrad Med. 2009;55:113. [PubMed] [Google Scholar]

Risk Stratification for Detection of Coronary Artery Disease and Effectiveness of Sensitization Programme on Reduction of Risk for Coronary Artery Disease among Adults in Selected Urban Areas of Vijayapur

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Abstract

Background: Cardiovascular diseases, especially coronary heart disease (CHD), are epidemic in India. The Registrar General of India reported that CHD led to 17% of total deaths and 26% of adult deaths in 2001-2003, which increased to 23% of total and 32% of adult deaths in 2010-2013. In India, studies have reported increasing CHD prevalence over the last 60 years, from 1% to 9%-10% in urban populations and <1% to 4%-6% in rural populations. Important risk factors for CHD in India are dyslipidemias, smoking, diabetes, hypertension, abdominal obesity, psychosocial stress, unhealthy diet, and physical inactivity. Suitable preventive strategies are required to combat this epidemic.

Aim: The aim of the study is to assess and stratify the risk of coronary artery disease among adults.

Materials and Methods: The research design used for this study is true experimental pre test post test control group design with follow up. Non probability Quota sampling technique will be used for this study. Sensitization programme is an intervention in which repeated administration of interventions to the participants to understand and involve in risk reduction strategies of coronary artery disease.

Result: Frequency and Percentage distribution of study participants according to their risk of CAD. Majority 144(72.0%) of the study participants had low risk of CAD followed by 52(26.0%) of the study participants who had intermediate risk and remaining 4(2.0%) of the study participants had high risk. A total of 200 adults were completed the questionnaire. The sociodemographic data represented that frequency and percentage distribution of adults according to socio- demographic profile such as age, gender, religion, marital status, educational status, occupation, dietary habits, family history of heart disease, smoking habits and alcohol consumption. The BMI level of the adults depicts that majority 131(91.0%) had normal BMI, 6(4.2%) were overweight and 7(4.9%) under weight. Off high risk study subjects, majority 28(50.0%) had over weight and 14(25.0%) each of the study subjects had normal weight and obese respectively. In relation to adult stress majority 52(92.9%) were at moderate risk of illness and only 4(7.1%) were at risk illness. It was clear that coronary artery risk score were same between experimental and control group during pretest but the difference in risk scores was highly significant when compared with

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posttest-I, posttest-II and posttest-III. Hence the sensitization programme was effective on reduction of coronary artery disease among the adults and hence second hypothesis was proved. It was seen that there was no association between knowledge risk scores of coronary artery disease with their selected socio-demographic variables such as Age, Gender, Religion, Education, laborer, dietary habit, family History, smoking habits, alcohol consumption but it was highly associated with Marital Status.

Conclusion: The study concludes that risk factor of coronary artery disease was highly associated with selected risk factors such as dietary habits, junk food consumption, family history, smoking habits, consumptions of alcohol, adult stress, BMI and physical activity**.**

Key words: Risk Stratification, Coronary Artery Disease, Sensitization Programme, Adults

Introduction

Cardiovascular diseases, especially coronary heart disease (CHD), are epidemic in India. The Registrar General of India reported that CHD led to 17% of total deaths and 26% of adult deaths in 2001-2003, which increased to 23% of total and 32% of adult deaths in 2010-2013. The World Health Organization (WHO) and Global Burden of Disease Study also have highlighted increasing trends in years of life lost and disability adjusted life years from CHD in India. In India, studies have reported increasing CHD prevalence over the last 60 years, from 1% to 9%-10% in urban populations and <1% to 4%-6% in rural populations. Case-control studies have reported that important risk factors for CHD in India are dyslipidemias, smoking, diabetes, hypertension, abdominal obesity, psychosocial stress, unhealthy diet, and physical inactivity. Suitable preventive strategies are required to combat this epidemic.[1]

Coronary heart disease (CHD) is a major cause of mortality and morbidity all over the world. According to a report of World Health Organization (WHO) in 2005, cardiovascular disease (CVD) caused 17.5 million (30%) of the 58 million deaths that occurred worldwide. While the prevalence and mortality due to CHD is declining in the developed nations the same cannot be held true for developing countries. There has been an alarming increase over the past two decades in the prevalence of CHD and cardiovascular mortality in India and other south Asian countries. India is going through an epidemiologic transition whereby the burden of communicable diseases has declined slowly, but that of non-communicable diseases has risen rapidly, thus leading to a dual burden. The burgeoning burden of CHD in India can be explained by the alarming rise in the prevalence of coronary risk factors like diabetes, hypertension, atherogenic dyslipidemias, smoking, central obesity and physical inactivity. Rapid urbanization and change in lifestyle that occurred during the past two decades have led to the growing burden of coronary risk factors in India.[2]

Concurrent with rapid urbanization and development there has been a remarkable change in the lifestyle of most Indians. People tend to smoke or chew tobacco as a mark of social status, tend to ignore physical activity, eat more junk or fatty food, consume more salt, and prone to more psychosocial stress. The resultant effect of this change is epidemic like increase in life style related disorders According to a very modest calculation India is a home to 155 million obese, 140 million hypertensive, 31.8 million CAD, 64 million diabetes including pre-diabetes and 1-2 million stroke patients.[3]

Symptoms of coronary artery disease presentations can vary from asymptomatic, stable chest pain and acute coronary syndrome to sudden cardiac death. Chest pain seen with stable angina is often mid-sternal, squeezing in quality, associated with a feeling of constriction or anxiety, radiating to the arms, neck, jaw, back or upper abdomen. These symptoms worsen with exertion because of the increased oxygen demand and improve with rest because of the decreased oxygen demand.

History taking is the most valuable technique to differentiate among different causes of chest discomfort. A thorough history and physical exam is the hallmark for the diagnosis of coronary artery disease. Characteristic features of stable angina are chest pain that worsens with emotional and physical exertion, cold weather, and meals. The patient experiences pain relief from rest and nitrates. Features of unstable angina include pain at rest that lasts over

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30 minutes and does not relieve with sublingual nitroglycerine. Pain associated with sweating, nausea, and vomiting may suggest myocardial infarction. Patients may present with complications of MI such as heart failure, ventricular septal defect (VSD), harsh systolic murmur, or papillary muscle rupture.

ECG is a tool for assessing patients who are either stable or in emergent situations. The presence of specific ECG findings should prompt referral, when necessary, for thrombolysis. However, ECG is not absolute as ST-segment elevations are present in only 50% of MIs confirmed by cardiac enzymes. Echocardiogram, stress testing, cardiac CT, and angiography are also other available options.

Early recognition of risk factors and primary prevention have significantly decreased the morbidity and mortality associated with CAD. Diet is a significant contributing factor to reduce the risk of coronary artery disease. According American Heart Association - 2019, the plant-based Mediterranean diet (high in vegetables, fruits, nuts, whole grains, and fish) is highly recommended. Replacing saturated fats with dietary monosaturated and polyunsaturated fats are found to be beneficial to reduce cardiovascular risks. Besides, dietary sodium reduction is found to have reduced BP and decreased risk for cardiovascular events, according to the DASH trial.

Physical activity is also equally beneficial for CAD risk reduction. At least 150 minutes per week of moderate-intensity activities and greater than 75 minutes a week of vigorous-intensity physical activities are helpful. Moderate activities include brisk walking (2.4 to 4 mph), biking (5 to 9 mph), active yoga, and recreational swimming, whereas vigorous activities include jogging/running, biking (greater than 10 mph), playing tennis, swimming, etc.[4]

Materials and Methods

Quantitative research approach with longitudinal measurement of outcome used for the present study. The research design used for this study is true experimental pre test post test control group design with follow up. The study was conducted at selected urban areas of Vijayapur. Total 200 adults were selected by using Non probability Quota sampling

technique. The study includes adults between the age group of (20 years to 60 years) who fulfilled the inclusion criteria and available at the time of data collection. The data were collected on selected urban areas of Vijayapur to assess and stratify the risk of coronary artery disease among adults. Short lecture and Video assisted teaching, weekly once for 2 weeks will be given to experimental group and control group will be on routine activities. Post test will be done at 3 Months, 6 Months and 9 Months after intervention. Frequency and Percentage distribution of Socio demographic profile. Frequency and Percentage Distribution, mean and standard deviation of study variables. Chi-square test will be used to find out the association between the risk scores of coronary artery disease of adults with their selected demographic variables. ANOVA for repeated measurement.

Results

Frequency and Percentage distribution of study participants according to their risk of CAD. Majority 144(72.0%) of the study participants had low risk of CAD followed by 52(26.0%) of the study participants who had intermediate risk and remaining 4(2.0%) of the study participants had high risk. A total of 200 adults were completed the questionnaire. The sociodemographic data represented that frequency and percentage distribution of adults according to socio- demographic profile such as age, gender, religion, marital status, educational status, occupation, dietary habits, family history of heart disease, smoking habits and alcohol consumption. The BMI level of the adults depicts that majority 131(91.0%) had normal BMI, 6(4.2%) were overweight and 7(4.9%) under weight. Off high risk study subjects, majority 28(50.0%) had over weight and 14(25.0%) each of the study subjects had normal weight and obese respectively. In relation to adult stress majority 52(92.9%) were at moderate risk of illness and only 4(7.1%) were at risk illness. It was clear that coronary artery risk score were same between experimental and control group during pretest but the difference in risk scores was highly significant when compared with posttest-I, posttest-II and posttest-III. Hence the sensitization programme was effective on reduction of coronary artery disease among the adults and hence second hypothesis was proved. It was seen that

there was no association between knowledge risk scores of coronary artery disease with their selected socio-demographic variables such as Age, Gender, Religion, Education, laborer, dietary habit, family History, smoking habits, alcohol consumption but it was highly associated with Marital Status.

Table 1: Frequency and percentage distribution of adults according to Socio- demographic Profile

SI No	Age	Low Risk		High Risk	
		Frequency	Percentage	Frequency	Percentage
1	20-30	57	39.6%	00	0.0.0
2	30-40	51	35.4%	10	17.9%
3	40-50	25	17.4%	31	55.4%
4	50-60	11	7.6%	15	26.8%
	Total	144	100.0%	56	100.0%
	Gender				
1	Male	73	50.7%	40	71.4%
2	Female	71	49.3%	16	28.6%
	Total	144	100.0%	56	100.0%
	Religion				
1	Hindu	88	61.1%	26	46.4%
2	Muslim	31	21.5%	19	33.9%
3	Christian	18	12.5%	10	17.9%
4	Others	07	4.9%	01	1.8%
	Total	144	100.0%	56	100.0%
	Marital Status				
1	Married	101	70.1%	39	69.6%
2	Unmarried	34	23.6%	13	23.2%
3	Widow/Widow	03	2.1%	00	0.0%
4	Divorce	06	4.2%	04	7.1%
	Total	144	100.0%	56	100.0%
	Educational Status				
1	Illiterate	31	21.5%	08	14.3%
2	Primary	34	23.6%	07	12.5%
3	Higher Primary	40	27.8%	19	33.9%
4	PUC	11	7.6%	09	16.1%
5	Graduates	20	13.9%	11	19.6%
6	PG & Above	08	5.6%	02	3.6%
	Total	144	100.0%	56	100.0%
	Occupation				
1	Labour	56	38.9%	19	33.9%
2	Private Employee	49	34.0%	27	48.2%
3	Unemployed	02	1.4%	03	5.4%
4	House wife	36	25.0%	07	12.5%
5	Business	01	0.7%	00	0.0%
	Total	144	100.0%	56	100.0%
	Dietary Habits				

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1	Vegetarian	74	51.4%	13	23.2%
2	Non-Vegetarian	70	48.6%	43	76.8%
	Total	144	100.0%	56	100.0%
	Family History of CAD				
1	Yes	01	0.7%	55	98.2%
2	No	143	99.3%	01	1.8%
	Total	144	100.0%	56	100.0%
	Smoking Habit				
1	Yes	20	13.9%	41	73.2%
2	No	124	86.1%	15	26.8%
	Total	144	100.0%	56	100.0%
	Consumption of Alcohol				
1	Yes	27	18.8%	38	67.9%
2	No	117	81.3%	18	32.1%
	Total	144	100.0%	56	100.0%

Table 01 shows that majority 57(39.6%) were belongs to 20-30 years of age, 51(35.4%) were belongs to 30-40 years of age, 25(17.4%) belongs to 40-50 years of age and 11(7.6%) were belongs to the 50-60 years of age. 56 study participants had risk of CHD. Off these 31(55.4%) were belongs to the age group 40-50 years, 15(26.8%) belongs to the 50-60 years of age and 10(17.9%) were in the age group 30-40. It was noted that, of the low risk study participants 73(50.7%) were males and remaining 73(49.3%) were females. Of the high risk study participants, 40(71.4%) of the study participants were males and remaining 16(28.6%) of the study participants were males. It was clear that, of the low risk study participants, majority 88(61.1%) were Hindu, 31(21.5%) were Muslims, 18(12.5%) were Christians and remaining 7(4.9%) were belongs to other caste. Off the high risk study participants, majority 26(46.4%) were Hindu, 19(33.9%) were Muslims, 10(17.9%) were Christians and only 1(1.8%) belongs to other caste. IN relation to marital status study participants with low risk CAD, 101(70.1%) were married, 34(23.6%) were unmarried, 3(2.1%) were widow/widower and 6(4.2%) were divorced. Off the high risk study participants, majority 39(69.6%) were married, 13(23.2%) were unmarried and 4(7.1%) were divorced. Majority 40(27.8%) were studied up to higher primary followed by 34(23.6%) had primary education, 31(21.5%) were illiterate, 20(13.9%) were graduates, 11(7.6%) were studied PUC and 8(5.6%) were post graduates. Off the study participants with high risk, majority 19(33.9%) had higher primary education, 11(19.6%) were graduates, 9(16.1%) were studied PUC, 8(14.3%) were illiterate, 7(12.5%) had primary education and only 2(3.6%) were post graduates. It was observed off the low risk study participant's majority 56(38.9%) were labors, 49(34.0%) private employee, 36(25.0%) housewife, 2(1.4%) unemployed and 1(0.7%) were doing business. Off the high risk study participants, 27(48.2%) were private employee, 19(33.9%) were labour, 7(12.5%) were housewife and only 3(5.4%) were unemployed. It was noted that, off the low risk study participants 74(51.4%) were vegetarians and remaining 70(48.6%) were Non-Vegetarians. Off the high risk study participants, 13(23.2%) of the study participants were vegetarians and remaining 43(76.8%) of the study participants were non-vegetarians. Study participants with low risk CHD consume junk food and all of the study participants with risk of CAD had habit of consuming junk food. In relation to family history of CAD revealed that 143(99.3%) of the study participants with low risk had no family history of CAD and 55(98.2%) of the study participants with high risk had family history of CAD. it was seen that among the study participants with low risk of CHD, 20(13.9%) had smoking habits and among the high risk study participants 41(73.2%) had smoking habits. Only 27(18.8%) low risk study participants had habit of consuming alcohol whereas 38(67.9%) of high risk adolescents had habit of consuming alcohol.

Determination of Effect of Sensitization Programme on Reduction of Risk for Coronary Artery Disease among Adults

Table 2: The Pre-existing Level of Knowledge of the Study Participants regarding Coronary Artery Disease

Duration of Study	EG		CG		Independent t-value	P-value
	Mean	SD	Mean	SD		
Pretest	8.17	6.49	8.21	6.61	-0.02	0.984(NS)
Posttest-I	12.71	5.38	8.64	6.41	2.57	<0.0001(S)
Posttest-II	20.03	3.69	9.71	6.24	7.52	<0.0001(S)
Posttest-III	27.10	2.88	9.96	6.36	12.9	<0.0001(S)

From Table No 02, it was clear that coronary artery disease risk score were same between experimental and control group during pretest but the difference in risk scores was highly significant when compared with posttest-I, posttest-II and posttest-III.

Hence the sensitization programme was effective on reduction of coronary artery disease among the adults.

Table 3: Association between Pre-test Knowledge Risk Scores of Coronary Artery Disease with their selected Demographical Variables

S.I No.	Pre-test knowledge		Chi-Square	df	P-Value	Result
	≤M	>M				
Age						
30-40	05	05				
40-50	19	12	0.515	2	0.773	NS
50-60	08	07				
Gender						
Male	22	18	0.26	1	0.61	NS
Female	10	6				
Religion						
Hindu	13	13				
Muslim	12	07	1.61	3	0.658	NS
Christian	06	04				
Others	01	0				
Marital Status						
Married	19	20				
Unmarried	11	1	7.44	2	0.02	S*
Divorce	2	2				
Educational Status						
Illiterate	3	5				
Primary	6	1				
Higher Primary	11	8	4.587	5	0.47	NS
PUC	6	3				
Graduates	5	6				
PG & Above	1	1				
Occupation						

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Labourer/Coolie	12	7				
Private Employee	15	12	1.0	3	0.80	NS
Unemployed	2	1				
House Wife	3	4				
Dietary Habit						
Vegetarian	6	7	0.83	1	0.36	NS
Non-Vegetarian	26	17				
Family History						
Yes	32	23	1.35	1	0.24	NS
No	0	1				
Smoking Habits						
Yes	23	18	0.068	1	0.79	NS
No	9	6				
Alcohol Consumption						
Yes	20	18	0.98	1	0.32	NS
No	12	6				

Table No 03, it was seen that there was no association between knowledge risk scores of coronary artery disease with their selected socio-demographic variables such as Age, Gender, Religion, Education, labour, dietary habit, family History, smoking habits, alcohol consumption but it was highly associated with Marital Status.

Discussion

Coronary heart disease is now the leading cause of death and disability globally. Despite recent declines in age-adjusted death rates from CHD, the number of CHD deaths has been increasing due to a combination of growth in population numbers and their longevity. In addition, manifestation and outcome of CHD varies substantially between and within countries. There are strong, unconfounded relationship between several risk factors and CHD mortality and non-fatal myocardial infarction. The most important risk factors for CHD are smoking, high blood pressure, dyslipidemia, diabetes, physical inactivity, unhealthy diet, and obesity. Controlling these risk factors even in middle- aged individuals, through lifestyle changes, medical treatment, or public health interventions, may reduce CHD incidence by almost one-half. The study result shows that frequency and percentage distribution of study participants according to their risk of CAD. Majority 144(72.0%) of the study participants had low risk of CAD followed by 52(26.0%) of the study participants

who had intermediate risk and remaining 4(2.0%) of the study participants had high risk. A total of 200 adults were completed the questionnaire. The sociodemographic data represented that frequency and percentage distribution of adults according to socio- demographic profile such as age, gender, religion, marital status, educational status, occupation, dietary habits, family history of heart disease, smoking habits and alcohol consumption. The BMI level of the adults depicts that majority 131(91.0%) had normal BMI, 6(4.2%) were overweight and 7(4.9%) under weight. Off high risk study subjects, majority 28(50.0%) had over weight and 14(25.0%) each of the study subjects had normal weight and obese respectively. In relation to adult stress majority 52(92.9%) were at moderate risk of illness and only 4(7.1%) were at risk illness. It was clear that coronary artery risk score were same between experimental and control group during pretest but the difference in risk scores was highly significant when compared with posttest-I, posttest-II and posttest-III. Hence the sensitization programme was effective on reduction of coronary artery disease among the adults and hence second hypothesis was proved. It was seen that there was no association between knowledge risk scores of coronary artery disease with their selected socio-demographic variables such as Age, Gender, Religion, Education, laborer, dietary habit, family History, smoking habits, alcohol consumption but it was highly associated with Marital Status.

Recommendations

- Several experts and organizations have published guidelines or recommendations on the identification, management and prevention of Coronary Artery Disease

- A similar study can be conducted on a large sample may help to draw more definite conclusions and make generalization.

- Our study highlighted the coronary artery risk score were same between experimental and control group during pretest but the difference in risk scores was highly significant when compared with posttest-I, posttest-II and posttest-III. Hence the sensitization programme was effective on reduction of coronary artery disease among the adults.

Conclusion

Preventing coronary artery disease is largely about controlling the risk factors. "Ideally, prevention habits start early, but they remain important all through life. Preventive healthcare is comprised of three main platforms. First, there is primary prevention, which suggests that patients should live in a way that he/she would not be a victim of the disease in the first place. In relation to CVD, this means maintaining ideal bodyweight, balanced diets, and cessation from unhealthy practices such as smoking and excessive alcohol consumption. However, CVD is a result of many factors which are modifiable as well as unmodifiable risk factors. Tertiary prevention aims to treat patients when the symptoms have been set and critical damage has already occurred. This in general aims to increase the life expectancy and quality of life of the patient via intensive procedures such as pacemaker placement and bypass surgery.

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Source of Funding: Self

References

1. Rajeev G, Indu M, Jagat N. Trends in Epidemiology in India. Annals of Global Health. Elsevier Publications [Internet]. Vol 82, 2016. Available from https://www.sciencedirect.com/science/article.

2. Krishnan N, Coronary Heart Disease and Risk Factors in India- On the brink of an epidemic? Indian Hear Journal. Elsevier Publication [Internet]. 2021 July. Available from https://www.ncbi.nlm.nih.gov/pmc/articles.

3. Shridhar Dwivedi. Life Style Interventions in the Prevention of Coronary Artery Disease. Ann Natl Acad Med Sci (India). [Internet]. Available From https://www.nams-india.in/anams/2014/81-110-1-SM.pdf(3).

4. Regmi M, Siccardi A. Coronary Artery Disease Prevention. Stat Pearls Publishing [Internet]. 2019 Sept. Available from https://www.researchgate.net/publication.

5. Goodarz Danaei, Kazem Rahimi. Coronary Heart Disease: Epidemiology and Prevention. Oxford Academic. [Internet]. 2020 January. Available From http://academic.oup.com/book/41095/chapter-abstract.

Study on Assessment of Self-Care Practices in Patients of Non Communicable Diseases in Aligarh

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Abstract

Self care involves all decisions which individuals, families,take for their own health particularly their own physical and mental well being. Staying fit, exercising, avoiding hazardous behavior etc. will all compound to self care. The aim of this study is to find the prevalence of self care practices in patients of Diabetes. A cross sectional study was done in registered villages of Rural Health Training Centre and **316** population was covered. All patients of the selected non communicable diseases above 18 years of age were selected who gave their consent. Self care practice assessment was done by including: Diabetes specific section including SDSCA measure - Summary of Diabetes Self- Care Activities Questionnaire. The findings showed that the prevalence of self-care practices in patients of diabetes was not very high. Slightly more than 50% diabetics were following good levels of self-care practices. Individual levels of self-care practices like medication, physical activity/ exercise, adequate diet, risky behaviours of tobacco intake and alcohol consumption, monitoring blood pressure/ blood sugar/ symptoms of COPD, weight management etc. showed varied prevalence. Mostly the patients with any non-communicable disease were found adherent to their medications. In patients of diabetes; age group, presently attending any health facility for disease management and receiving health care provider's advice for lifestyle modifications were associated significantly with self-care practices.

Key words: self care practices, non communicable diseases, monitoring, maintenance

Introduction

What is Self Care?

Self care involves all decisions which individuals, families, take for their own health particularly their own physical and mental well being. Staying fit, exercising, avoiding hazardous behavior etc. will all compound to self care.[1] Self care can be performed in illness as well as the good health of an individual. Non communicable diseases include cardiovascular diseases, renal, nervous and mental diseases, musculoskeletal conditions, chronic non specific respiratory diseases (COPD), blindness, permanent results of accidents, diabetes, senility, various other metabolic, degenerative diseases and chronic results of communicable diseases.[2] All the above, four NCDs make the largest contribution to the countries. Some of these are, namely, cardiovascular diseases, cancer, diabetes and chronic respiratory diseases.[1]. Non communicable diseases kill 41 million people

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each year, equivalent to 71% of all deaths globally as stated under the key facts by the World Health Organisation[3]. The major four diseases account for over 80% premature NCD deaths. As the NCDs are of longer duration, people spend a large part of their lives under the umbrella of these diseases. Spending such a long part of their life, taking proper treatment, looking after themselves, getting into their disease, knowing it, being aware of it and learning how to take care of it becomes very important. Adhering to disease management, adhering to what needs to be done without fail, avoiding hazardous behaviours, taking medication on time, avoiding risky behaviours, looking after one's physical monitoring features all become a part of life. **Self-care** is not a new concept. About 50-60% of all care persons do for themselves is actually self care as said by the Director General of WHO. Self care should be followed on a routine basis, it should be considered an integral part of care. Although it should not be used as a replacement to the basic component of essential health care.The aim of this study is to find the **prevalence of self care practices in patients of Diabetes**. The study focuses on the prevalence of various self care practices, secondly the pattern of self care i.e., it's components, namely-

- Self care maintenance
- Self care monitoring

Materials and Methods

A cross sectional study was conducted in Rural field practice areas of Department of Community Medicine, Jawaharlal Nehru Medical College, AMU, Aligarh. It included all the cases of *diabetes, hypertension and chronic respiratory diseases i*n the study area. The study period was one year (December 2020- December 2021).

Sample Size

The sample size was determined by the formula,

n = $Z^2_{1-a/2}$ PQ/L^2

Where, n = Sample Size

$Z_{1-α/2:}$ Statistic corresponding to level of significance. (1.96 for 95% CI)

P = Prevalence of health problems taken(26%)

Q = (1-P)

L = Absolute error (15%)

The final sample after rounding off came out to be **486** chronic disease patients.

Inclusion Criteria: All patients of the selected non communicable diseases above 18 years of age. All the patients who were residing in the rural areas of the field practice areas of the Department of Community Medicine, J.N.M.C, A.M.U, Aligarh. All those patients who gave their consent for the study.

Exclusion Criteria: The patients who did not give consent. Terminally ill patients and those who were bedridden.

Written informed consent was taken before starting the interview.

Operational Definition of Diabetic Patient:

Any patient who was a resident of the field practice areas of RHTC, Department of Community Medicine who was above 18 years of age and was already diagnosed to be a patient of diabetes mellitus (Type I or type II) either at RHTC or at any other health facility. The patients who at their time of diagnosis had fasting plasma glucose of >= 126mg/ dl or postprandial blood glucose 2h-PG 200mg/dl at the time of diagnosis were enrolled.[4]

Self care practice assessment was done by including: **Diabetes specific section including SDSCA measure - Summary of Diabetes Self- Care Activities Questionnaire[5].**

The data collected was tabulated and analyzed using the IBM SPSS 20.0. Appropriate statistical tests were applied based on the type of variables. Ethical approval was taken for conducting the study from the Institutional Ethics Committee (Regd.) J.N. Medical College, AMU, Aligarh. (D.No. 176/FM/ IEC, 3-11-2020). The designated period was one year but during the study duration, the government had to impose a lockdown from April 2021 to July 2021. So only **316** population was covered.

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Results
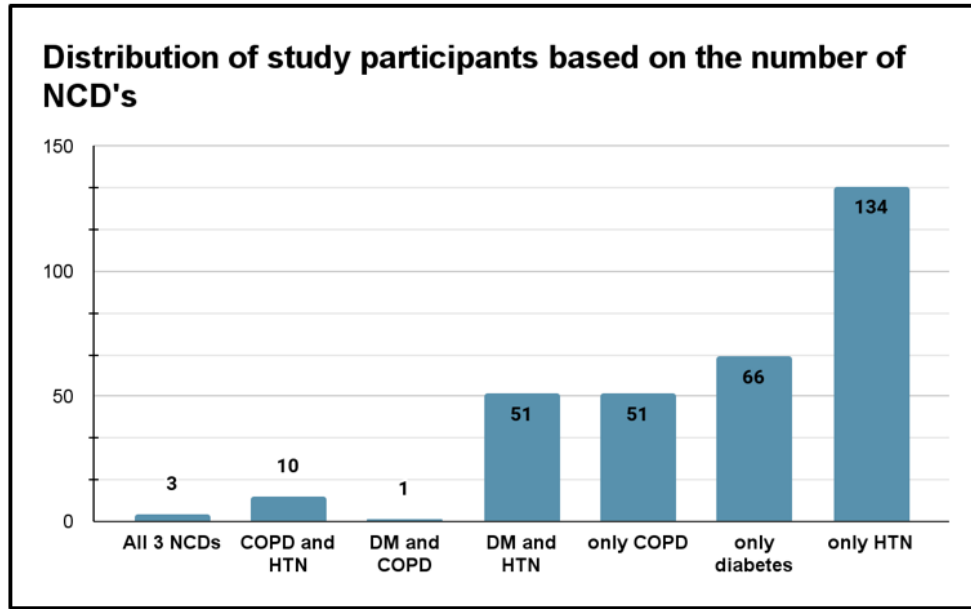
Figure 1: Distribution of the study participants based on the number of NCDs

According to the disease condition per se, 121 out of 316 participants (38.3%) had diabetes mellitus in this study.
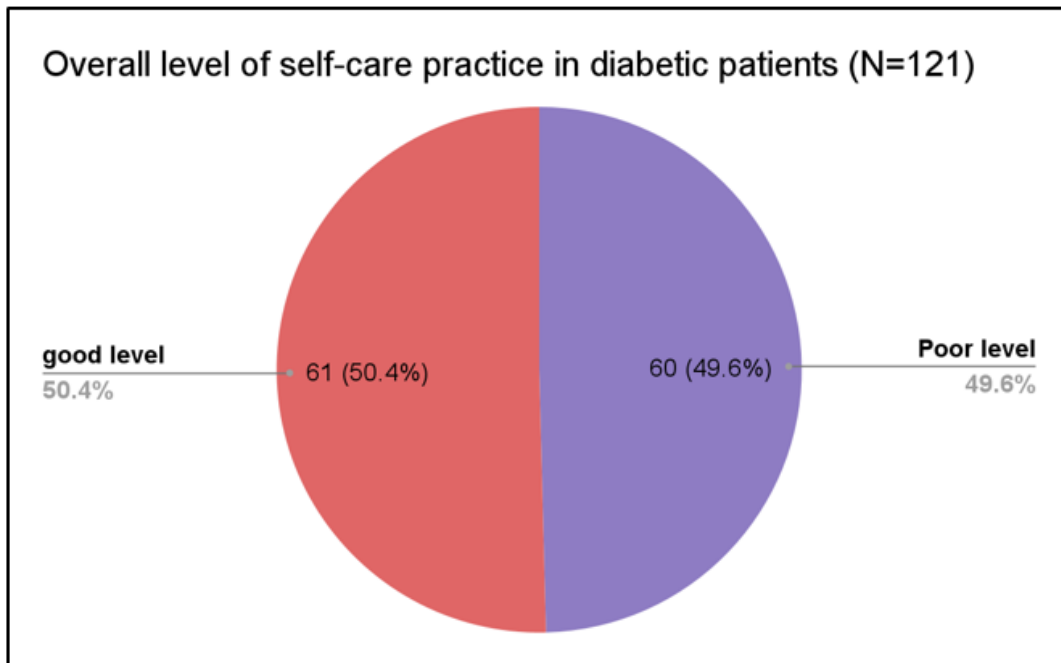
Figure 2: Prevalence of overall level of self-care practice

It was found that **50.4%** diabetic patients were performing a **good level** of self-care practices in this study.

Table 1: Distribution of participants based on the individual subscales of the SDSCA self-care Measure (N=121)

Serial no.	Individual subscales of self-care practice	Level of self-care practice performance			
		Good (days per week)	N(%)	Poor(days per week)	N(%)
1.	General diet	>=3	72(59.5)	<3	49(40.5)
2.	Physical Activity and Exercise	>=2	52(43.0)	<2	69(57.0)
3.	Blood Sugar Testing	1-7	36(29.8)	0	85(70.2)
4.	Medication usage days	7	101(83.5)	<7	20(16.5)
5.	Foot care days	>=2.8	112(92.6)	<2.8	9(7.4)
6.	Specific diet	>=3.25	76(62.8)	<3.25	45(37.2)
Specific diet: questions	On how many of the last 7 days did you eat five or more servings of fruits and vegetables?	>=4	61(50.4)	<4	60(49.6)
	On how many of the last 7 days did you eat high fat foods such as red meat or full fat dairy products?	<3	55(45.5)	>=3	66(54.5)
	On how many of the last 7 days did you space carbohydrates evenly throughout the day?	>1	24(19.8)	<1	97(80.2)

The above table shows the good as well as poor levels of self-care practices.

Table 2: Pattern of self-care maintenance and monitoring seen in diabetic patients (N=121)

Self-care component		
Self-care maintenance		
Physical Activity self-care practice	(mean±SD)	3.56± 4.28
Medication usage self-care practice	(mean days per week)	5.47± 2.42
Foot care self-care practice		3.02± 0.84
General diet self-care practice		3.41± 2.11
Current smoker[1]	Yes	4 (3.3%)
	No	117 (96.7%)
Any smokeless form of tobacco intake in the patient[1]	Yes	17 (14%)
	No	104 (86%)
Presently an alcohol drinker [1]	Yes	4 (3.3%)
	No	117 (96.7)
Total duration of alcohol intake	(mean±SD) (years)	0.71± 4.44
Self-care Monitoring		
Blood sugar testing self-care practice	(mean±SD) (mean days per week)	0.46± 1.07
Does the patient have any previous records?[1]	Yes	76 (62.8)
	No	45 (37.2)
Median duration of record made last time (days)	Median days	30.00
	(Range)	(1 to 180)

Note: 1. N(%). The other values are depicted as mean ±standard deviation(S.D) Self-care maintenance

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Discussion

Age: The mean age of the participants was 58.56 years±11.26 years. Most of the study participants belonged to the age group 54-71 years (58.2%), followed by 36-53 years(27.2%), 11.4% of patients were above 72 years and finally only 3.2% persons were from 18-35 years age group. **Gender:** Our study showed that the majority were females (200, 63.3%). The rest were males. **Educational Level (upto the highest):** Most of the participants were illiterate (103, 32.6%), 23.1% patients could read and write, similar number was of those who had completed upto either secondary or senior secondary education (22.2%), There were very few patients who had done undergraduation or above. A similar percentage was found for primary/ upper primary education. **Current working status and the occupation of the participants:** Most of them were having a non income generating occupation. These were 76.9% patients, out of whom maximum were unemployed or retired persons (42.2%) followed by being a homemaker (32.2%). Amongst those who possessed an income generating occupation (23.1%), most were working in occupations categorized as semi or unskilled (12.3%), followed by semiprofessional or skilled occupations (6.6%), waged (1.9%) and lastly employed at a professional (3.2%) post. Most (91.1%) of the study sample participants were not pensioners. **Religion, Marital status:** A small number of the study population was the Muslims (25.3%) and the majority of the study population was married (77.2%). 69 patients were widowed females or males whereas only 2 (0.6%) were unmarried. **Socio economic status (Modified BG Prasad 2020):** Most of the participants were falling under the class 4 category (37.3%) of modified BG Prasad classification.Mean per capita income of all the 316 participants was found to be 3130.04± 4756.83 rupees. Median number of family members was found to be 5 (1-17).

As shown in table 1, Good overall level of self-care practice was seen in half (50.4%) of the diabetic patients. Amongst the individual subscales, the best level of self-care was seen for foot care (92.6%) and medication usage(83.5%). Next, both the diet subscales showed good levels in more than half of the patients (specific diet= 62.8% and general diet= 59.5%). Good level of physical activity and exercise was seen in 43% of diabetics. Least (29.8%) percentage of diabetics showed a good level of blood sugar testing behaviour.

In a recent study[6], it was found good overall self care practice where a majority (62.1%) practiced recommended foot care. The overall level seen here is similar to the present study whereas foot self-care seems better in this study. This might be due to different methodology of categorizing good levels of foot care.

The good overall level of self care assessed by the same scale was seen in 54.5% diabetics in another study by[7]. The study in conjunction with ours also recorded lowest self care in blood sugar testing.

SDSCA was also used in another Indian study conducted[8] wherein separate self care practice prevalences were as follows; foot care in 37.4%, drug compliance in higher percentage (around 72%), 61.5% responding yes to blood sugar testing, 62.6% exercising for more than 5 days a week, more than one third individuals were eating more than 5 servings of fruits, avoiding sweets each. General diet's good level was seen in 40% of individuals. Most of these findings are different from ours, except medication adherence and eating more than 5 servings of fruits being somewhat similar in pattern.

Another study from the southern part of India[9] reported good levels of self care for all subscales separately. 86% respondents had fats/fried foods consuming less than 25% of the meal over last week, contrary to 45.5% consuming these for less than 3 days in a week in the present study. Similar results were 44% eating fresh fruits/ vegetables (50.4% in the present study), 79.8% adherent to medications. Contrasting results were lower levels of (20.5%) exercising and greater percentage (70%) of testing blood sugar regularly. Our study showed that 43% of patients were exercising for more than 1 day in a week. The difference in exercising levels might be due to the lack of awareness about exercising in the patients residing in Aligarh. Blood sugar testing in our study was considered good if done once a day throughout the week whereas in this study it was considered to be done once in 3 months.

An Indian study from rural Tamil Nadu[10] showed

a similar prevalence to the present study; reported as moderate overall self care adherence in 42%. Blood sugar testing (75.2%) and medication (70.4%) (similar to present study) were high in the study population while foot care adherence was poor (17.6%). The present study showed lesser blood sugar testing as the population in rural Aligarh might be unaware about the importance of regular blood sugar testing.

A study[11] showed that prevalence of good level of medication self-care was seen in 48%, exercising for 5 days in a week in 20.5%, blood sugar testing once in 3 months done by 65% and inspecting the inside of footwear daily was seen in 0.5% patients. These findings were different from those in the present study. The weekly assessment criteria are considered in the present study, therefore the results may have differed.

Another study[12] showed almost similar results for a good level of self care practices; general diet seen in 45.9%, good level of exercise seen in 43.4%. Dissimilar results were medication adherence seen in lower percentages (60.5%) and blood sugar monitoring seen in 76.6% which was much more than the present study. The difference seen might be mainly because of greater contacts with healthcare providers which might have improved drug compliance whereas unavailability of glucometers at homes might have led to decreased levels of sugar monitoring in the patients in the present study.

As shown in Table 2

Self-Care Maintenance

The above table shows that people having diabetes were maintaining their health in the shown pattern. Among all the self-care practices, general diet, physical activity, medication usage and foot care were part of maintaining health in a diabetic.Out of these, medication usage was found to be having the best of all levels of self-care, which was 5.47 ± 2.42 mean days per week. A good level (7 days/wk) was performed by 83.5% of patients with diabetes. The other three showed a similar level, 3.02± 0.84 mean days per week, persons took care of their feet on a routine basis.

General diet subscale is scored to know the mean number of days in a week a person follows his/her eating plan and also on an average in a month. In our study population, around 60% of patients were found to be following the eating plan for 3.41± 2.11 mean days per week. Physical activity and exercise had a level of 3.56± 4.28 days per week.

On account of addiction we found that out of 121 persons with diabetes as a chronic condition, only 3.3% were smokers, but 14% of them did chew other smokeless forms of tobacco whereas a similar percentage (3.3%) of persons were alcohol drinkers.

Self-Care Monitoring In the study population of 121 persons with diabetes, we found that people performed very low level of blood sugar testing as a measure of self-care that is 0.46± 1.07 mean days per week.

On asking about the availability of any past records of blood sugar monitoring reports, either fasting, post prandial or HbA1c we found that around two third (62.8%) were having these records. The mean duration of the record made last time was 30 days.

Most patients were not smoking currently (96.7%) whereas lesser (86%) were taking smokeless forms of tobacco. The patients were maintaining their health in the present study by having a general diet for 3.41(±2.11), doing physical activity for 3.56(±4.28), caring for the feet for 3.02(±0.84) and taking medicines for 5.47(±2.42) mean days per week.

The participants of a study[13] quoted a study showing a similar medication adherence as that of ours, 6.6(±1.5) mean days per week, an exercise level of 1.6(±0.8 hours) and foot care being performed on 4.8±2.4 days per week (results of our study were almost alike). This study assessed the general diet by mean scores in a different manner hence cannot be compared. A study [14] showed complementary results. They reported that medication compliance was done on 5.66(±2.66) mean days /week, exercise on 1.64(±1.00) days/week. Dissimilar level of foot care was seen (1.92± 1.5 mean days/week). A study[15] found that participants were taking medicines on 6.61±1.22 days /week, recommended physical activity on 2.44±2.56 days/week and checking foot for 2.62±3.27 days/week. These findings were nearly like our findings.

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The patients were testing their blood sugar for 0.46(±1.07) mean days per week in our study.

The participants of study[13] showed blood sugar testing being done on a greater mean number of days per week (3.8±2.7) than the present study. The possible reason may be the participants were more aware of their condition and had better access to healthcare.A study [14]reported blood sugar testing on 1.92±1.5 days /week. This finding was dissimilar to ours may be because only elderly individuals were considered in this study.

There is association of sociodemographic variables with the overall self-care level in diabetes. Among all, we saw that 61.9% diabetic patients in the 36-53 years age group were having a poor level of self-care whereas those in the 54-71 years group had a higher proportion performing at a good level of self-care. Those below 36 years or above 72 years also have a higher proportion of patients in the poor level of diabetes self-care. (**p= 0.03**)

Gender, marital status, educational level, occupation, socioeconomic status, being a head of household, family history of disease, living alone *were not found to be associated* with the overall self-care practices of diabetic patients.

Resembling results were shown by a randomized controlled trial done by a study[16]. They reported that medication review, face to face counseling of the study participant done by the healthcare provider was found useful and was associated with the number of times chronic care clinics were attended.

Conclusion

Self care knowledge during each contact with the health personnels must be imparted to the patients suffering from NCDs. Making a chronic disease patient a part of his/ her disease management depends largely on the healthcare provider. The healthcare providers across all tiers of the health system must be trained routinely for adequate evidence based lifestyle modification advice.At the level of the family; caregivers, spouses, children of the patients, neighbors - all have a very important role in the patients health and adherence to self-care behaviors. Hence, caregivers should also be educated

routinely. In Uttar Pradesh, particularly in Aligarh the state should be strengthening the health systems and the health workforce should be trained for routine monitoring and management of non-communicable diseases.

References

1. Self_care_module.pdf [Internet]. [cited 2021 Dec 31]. Available from: https://www.who.int/ncds/management/Self_care_module.pdf

2. K.Park,25TH Ed. Chap 6, Pg-391

3. Non communicable diseases [Internet]. [cited 2022 Jan 5]. Available from: https://www.who.int/news-room/fact-sheets/detail/noncommunicable-diseases

4. ADA 2019 Diabetes Management Guidelines (1).pdf.

5. Toobert DJ, Hampson SE, Glasgow RE. The summary of diabetes self-care activities measure: results from 7 studies and a revised scale. Diabetes Care. 2000 Jul 1;23(7):943–50.

6. Getie A, Geda B, Alemayhu T, Bante A, Aschalew Z, wassihun B. Self- care practices and associated factors among adult diabetic patients in public hospitals of Dire Dawa administration, Eastern Ethiopia. BMC Public Health. 2020 Aug 12;20:1232.

7. Gurmu Y, Gela D, Aga F. Factors associated with self-care practice among adult diabetes patients in West Shoa Zone, Oromia Regional State, Ethiopia. BMC Health Serv Res. 2018 Sep 24;18(1):732.

8. Garg S, Paul B, Dasgupta A, Maharana S. Assessment of self-care activities: A study among type 2 diabetic patients in a rural area of West Bengal. Int J Med Sci Public Health. 2017;1.

9. Gopichandran V, Lyndon S, Angel MK, Manayalil BP, Blessy KR, Alex RG, et al. Diabetes self-care activities: A community-based survey in urban southern India. Natl Med J INDIA. 2012;25(1):4.

10. Karthik RC, Radhakrishnan A, Vikram A, Arumugam B, Jagadeesh S. Self-care practices among type II diabetics in rural area of Kancheepuram district, Tamil Nadu. J Fam Med Prim Care. 2020 Jun 30;9(6):2912–8.

11. Dinesh PV, Kulkarni AG, Gangadhar NK. Knowledge and self-care practices regarding diabetes among patients with Type 2 diabetes in Rural Sullia, Karnataka: A community-based, cross-sectional study. J Fam Med Prim Care. 2016;5(4):847–52.

12. Rajasekharan D, Kulkarni V, Unnikrishnan B, Kumar N, Holla R, Thapar R. Self-care activities among patients with diabetes attending a tertiary care hospital in mangalore karnataka, India. Ann Med Health Sci Res. 2015 Feb;5(1):59–64.

13. Toobert DJ, Hampson SE, Glasgow RE. The summary of diabetes self-care activities measure: results from 7 studies and a revised scale. Diabetes Care. 2000 Jul 1;23(7):943–50.

14. Sk AS, Ea S, Ha MAM, Na S. Social support and self-care activities among the elderly patients with diabetes in Kelantan. 2015;10.

15. Gunggu A, Thon CC, Whye Lian C. Predictors of Diabetes Self-Management among Type 2 Diabetes Patients. J Diabetes Res. 2016;2016:9158943.

16. Wagner EH, Austin BT, Davis C, et al. (2001) Improving chronic illness care: translating evidence into action. Health Affairs 20: 64–78.

Webinar – Is the World Experiencing Dual Pandemics: COVID and Mental Health? Let's talk Positive

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Abstract

Background: In partnership with the Poornima University, the Jodhpur School of Public Health conducted a participatory and live webinar on "Is the world experiencing dual pandemics- COVID and Mental Health? Let's talk positive." On 15th May 2021. Dr. Naresh Nebhinani Additional Professor, Department of Psychiatry AIIMS Jodhpur was the distinguished speaker, who along with Poornima University co-founder Mr. Rahul Singhi and other panellists from Jodhpur School of Public health addressed the topic.

Findings: The COVID-19 pandemic and the shattering economy have resulted in a detrimental impact on many people's mental health around the globe. It has created new barriers among children, health workers, and elderly along with those who already suffer from mental illness. Every third person who was infected by COVID has shown some signs of mental health issues in one form or the other and prevalence of such disorders have increased by 35% in COVID. The role of behavioural changes towards mental health issues, along with positive attitude, better coping mechanisms, positive lifestyle changes including healthy living, sobriety, healthy eating, regular physical exercise, relaxation, spiritual practice, connectedness with family and close associates, balanced use of gadgets, proper sleep etc result in better outcomes and indicators of mental health resulting due to COVID 19 impacts could be controlled.

Conclusion: While the health-care system fights to rescue millions of lives on a daily basis, there is a significant risk of a looming pandemic of hidden mental health conditions that might devastate the present mental-health infrastructure. We need inter-disciplinary support of various sectors to execute the plan for people's participation to talk about mental health issues. With specialized psychological interventions and multi-stakeholder collaboration, we can easily curb mental health issues and have a positive outlook in life thereby establishing a balance despite external situations.

Key words: Mental Health, COVID 19, pandemic

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Introduction

An engaging and live global webinar on "COVID and Mental Health" was hosted by Poornima University and Jodhpur School of Public Health (JSPH) on May 15th, 2021. The webinar aims to highlight on the emerging cases of mental health disorders as a side effect of COVID 19 pandemic lockdowns and ways to develop various coping skills. COVID-19, like other pandemics in history, has resulted in highlighting mental health issues. According to an impact assessment conducted by the NNCBI, signs of Post-Traumatic Stress Disorder (PTSD) and anxiety-depression were more prevalent even after one year of Ebola response in the instance of the 2014 Ebola outbreak. The global HIV pandemic also provides a similar picture. It is found that the prevalence of mental illnesses in HIV-infected individuals is substantially higher than in the general population. Rapid human-to-human transmission of the SARS-CoV-2 resulted in the enforcement of lockdowns to stem the further spread of the disease (World Health Organisation). This resulted in isolation, social distancing, and closure of educational institutions, workplaces, and entertainment venues, forcing people to confine themselves to their homes in order to help break the transmission chain. Individuals' social and mental health have clearly been harmed as a result of these restrictions. Therefore, the distinguished speaker and chairpersons of the webinar, along with other team members, met to discuss the current global situation of mental health issues amid COVID-19 outbreak, challenges and preventive measures, and future directions for long term victory to eliminate any mental health issues due to such outbreaks.

Overview and Findings:

The World Health Organisation (WHO) declared COVID-19 as a Public Health Emergency of International Concern (PHEIC) on 30 January 2020.

COVID-19 Pandemic has reached a level of a humanitarian crisis with over 398 million confirmed cases and over 5.75 million deaths reported globally to date (till 9 February 2022) with India contributing almost over 42.4 million confirmed cases and about 5 lakh deaths. This global humanitarian crisis of COVID-19 pandemic has not only posed a significant risk to physical health and wellbeing, but has also made an impact on mental health, which can have disastrous effects on the health system[5]. According to an impact assessment conducted by the NNCBI, signs of Post-Traumatic Stress Disorder (PTSD) and anxiety-depression were more prevalent even after one year of Ebola response in the instance of the 2014 Ebola outbreak. The global HIV pandemic also provides a similar picture. It has been found that the prevalence of mental illnesses in HIV-infected individuals is substantially higher than in the general population. Rapid human-to-human transmission of the SARS-CoV-2 resulted in the enforcement of lockdowns to stem the further spread of the disease (World Health Organisation). This resulted in isolation, social distancing, and the closure of educational institutions, workplaces, and entertainment venues, forcing people to confine themselves to their homes in order to help break the transmission chain. Individuals' social and mental health has clearly been harmed as a result of these restrictions. There have been reports of mental health issues from all across the world. Stress, anxiety, depression, insomnia, denial, rage, and fear were the most commonly reported mental health disorders. In this scenario, children and the elderly, frontline workers, and those with mental illnesses are the most susceptible. Suicides associated to COVID-19 are becoming more common. Mental health issues have been addressed globally through the use of guidelines and intervention strategies. In this context, social media has had a significant impact. The Government of India has released state-specific intervention methods, tele psychiatry consultations, and a toll-free number for psychological and behavioural concerns to address this critical issue.

Preventive Measures and Strategies:

The mental health issues are subject to behaviour change, Positive attitude in seeing the predominantly positive part i.e. glass half full, not half empty. It believes in 'seed of equivalent benefit' i.e. fixed purpose to make every experience, whether it is pleasant or unpleasant, yield some form of benefit. It helps to maintain equanimity and to nurture resilience. Hence, a positive Attitude is very useful to everyone. Qualities of maintaining a positive outlook involve being more relaxed, comfortable, approachable, and more resilient. It is also labelled as Positive Mental

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Attitude and is a plus characteristic in all of us. Individuals should strive to clear mental lenses so they are more able to see situations in an opportunistic manner. The 'Covey's Circle of Influence' highlights the importance of a Proactive approach compared to Reactive focus. Majority of people become reactive in any given situation, thus reducing one's circle of influence (things within our control). However if one becomes proactive, practical, positive, focused, with problem solving and adaptive approach in any given situation, one's circle of influence increases and one tends to keep the situation within control[8]. So, one must focus on problems and not on the emotions and should always remain proactive especially during these testing times.

The example of good or bad coping mechanisms could be explained by an example of 'Stress Bucket', where a bucket depicts resilience and a tap depicts coping behaviour. The size of the bucket depicts one's resilience. The more resilient one is, the better prepared one becomes to handle stress. However, the problem starts when this bucket overflows. If one is able to cope up with the stress, it will not affect the individual, however if one lacks a healthy coping approach, then one can land oneself into trouble. Therefore, if the bucket of resilience is large, and the tap of the bucket depicting a coping approach is working, one can handle any problem and related stress that comes one's way. Stress is a concept that depends on one's outlook, 'The concept explains that one needs to understand that stress is not only 'the pressure from outside, but it is also one's response to stressors. Stress prevention and management becomes easier if one improves on how to perceive and how to respond[9].

Another healthy coping mechanism is explained through The Spoon Theory, created by Christine Miserandino, which materially explains the concept of energy in relation to mental illnesses and stress. Although the original example was used in relation to chronic illness, it applies to mental illnesses as well. The spoons represent the amount of energy a person has to spend on any given task in the duration of that day. If an individual wakes up to realize they do not have the mental energy to complete as many tasks as they were able to yesterday, they may characterize that as having only ten spoons. This means that

the individual should practice healthy coping mechanisms and realize that they will have to spend their spoons, or energy, wisely. For example, a list of tasks for an individual include brushing their teeth (which costs them two spoons), making breakfast (five spoons), and doing laundry (five spoons). This adds to a total of twelve spoons when the individual only has ten to spend. In this scenario, the individual can either save one task for another day or use more energy than they possess. The latter would take away from the next day's spoons and the cycle would repeat. However, if an individual wakes up with fifty spoons, they will have more than enough energy to tackle those same tasks and more. Thus, The Spoon Theory in relation to mental health is so important as it helps individuals recognize the amount of energy they have and can then take steps to help their mental health on any given day. It makes managing stress much smoother and can help an individual recognize their needs so they are better able to take care of their mental health.

There are several practices that everyone should follow as a routine: deep breathing, having a smiling face (keeps a person light, and positive), and pursuing a productive, exciting and active life. Setting goals, having a gratitude jar where one can show gratitude towards the world, god, cosmos and our near and dear ones who have made good things for them. The other solutions to a healthy life include physical exercise, good nutrition, self-reflection, mindfulness, and spirituality.

Due to the pandemic, we are encouraging immunity boosters, similar to that for mental health psychology. Immunity should be built which is a system of adaptive resources and positive characteristics[10].

The Mental Health Care Act 2017 was passed on April 7, 2017 as part of the National Mental Health Program (NMHP) and went into effect on July 7, 2018. "An Act to provide for mental healthcare and services for persons with mental illness, and to safeguard, promote, and fulfil the rights of such persons during delivery of mental healthcare and services, and for matters connected therewith or incidental thereto," the law stated in its first paragraph. The Mental Health Act of 1987, which was passed on May 22,

1987, was replaced by this Act. The program's main goals include ensuring that everyone has access to basic mental health treatment, supporting the application of mental health knowledge, encouraging community engagement in the development of mental health services, and improving human resource development.

Challenges:

We appear close to the finish line, yet we still have miles to run to successfully implement mental health strategies. There are many barriers to overcome to reach our goal of eliminating mental issues. Unfortunately, those most likely to be affected by Mental health issues are also finding it difficult to access healthcare, including knowledge gaps, stigma, shortage of human resources, and accessing quality of care when it comes to mental health issues.

The following are some of the challenges facing the prevention of mental health issues:

1. Knowledge gaps: While the issues of mental health have been prevalent for a long time in the society, they have been amplified by the pandemic. Yet, information regarding mental health is outdated or insufficient. We need to make sure that the best practices in this field are available and can quickly be disseminated.

2. Stigma: The stigma in society about mental health prevents people from seeking treatment. People are not encouraged to talk openly about these issues.

3. Access to care: mental health issues are not showing any visible symptoms which makes it challenging to seek professional care. Health services at any level do not have enough capacity to take care of this sensitive problem. The barriers to mental health care accessibility should be encouraged on a mass level. The insufficient mental healthcare policies, lack of education about mental illness, and disorders along with stigma in the society need to be addressed.

Conclusion

While the health-care system fights to save millions of lives on a daily basis, there is a significant risk of a looming pandemic of hidden mental health conditions that might devastate the present mental-health infrastructure. To tackle the aftermath of the COVID-19 pandemic, people's mental health must be addressed simultaneously with other measures for managing and controlling the disease and the pandemic as a whole. Specialized psychological intervention, as well as proper and consistent risk and crisis communication, are all essential. Major innovations in the field of testing, technology, and medicines have made the commitment to elimination possible. The need for awareness, affordability, and training is of utmost importance to reach the set goal.

References

1. Abramson A. How COVID-19 may increase domestic violence and child abuse. https://wwwapaorg [Internet]. 2020 Apr 8; Available from: https://www.apa.org/topics/covid-19/domestic-violence-child-abuse

2. Chandra J. Covid-19 lockdown | Rise in domestic violence, police apathy: NCW. The Hindu [Internet]. 2020 Apr 2; Available from: https://www.thehindu.com/news/national/covid-19-lockdown-spike-in-domestic-violence-says-ncw/article31238659.ece

3. Kolkata March 31 ML, March 31 2020UPDATED:, Ist 2020 08:00. 20% increase in patients with mental illness since coronavirus outbreak: Survey [Internet]. India Today. 2020. Available from: https://www.indiatoday.in/india/story/20-per-cent-increase-in-patients-with-mental-illness-since-coronavirus-outbreak-survey-1661584-2020-03-31

4. The Spoon Theory written by Christine Miserandino [Internet]. But You Dont Look Sick? support for those with invisible illness or chronic illness. 2013 [cited 2022 May 17]. Available from: https://butyoudontlooksick.com/articles/written-by-christine/the-spoon-theory

5. Do you have the obsessive-compulsive coronavirus disorder? - Times of India [Internet]. The Times of India. Available from: https://timesofindia.indiatimes.com/life-style/health-fitness/health-news/do-you-have-the-obsessive-compulsive-coronavirus-disorder/articleshow/74655648.cms

6. WHO | Mental Health Atlas-2017 country profiles [Internet]. WHO. Available from: https://www.who.int/mental_health/evidence/atlas/profiles-2017

Anil Purohit, Priyakanta Nayak, Lalita Kumari et. al. / Webinar – Is the World
Experiencing Dual Pandemics: COVID and Mental Health? Let's talk Positive

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7. COVID-19 and violence against women What the health sector/system can do [Internet]. 2020. Available from: https://www.who.int/reproductivehealth/publications/emergencies/COVID-19-VAW-full-text.pdf

8. Mental health and COVID-19 [Internet]. www.euro.who.int. 2020. Available from: http://www.euro.who.int/en/health-topics/health-emergencies/coronavirus-covid-19/novel-coronavirus-2019-ncov-technical-guidance/coronavirus-disease-covid-19-outbreak-technical-guidance-europe/mental-health-and-covid-19

9. World Health Organization. Mental Health and Psychosocial Considerations During COVID-19 Outbreak [Internet]. 2020 Mar. Available from: https://www.who.int/docs/default-source/coronaviruse/mental-health-considerations.pdf

Study of Serum Albumin as a Prognostic Marker in Critically ILL Patients

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Abstract

Introduction: Serum albumin is an important parameter in the assessment of the nutritional status of both acute and chronically ill patients[1], Low albumin levels have been associated with morbidity and mortality in critically ill patients. It is thus, important to identify the patients at the time of admission who are likely to have a poor outcome, so that such patients can be managed aggressively.

AIM: Study Of Serum Albumin As a Prognostic Marker in Critically ill patients.

Materials and Methods: After approval from the Institutional Ethical committee all patients were selected as per inclusion and exclusion criteria. The patients, who are critically ill was selected from MICU and Serum albumin level was measured by BECKMAN COULTER ANALYZER. The statistical analysis was performed by statistical software SPSS version 21.0.

Result: The present cross- sectional study was conducted in the department of medicine, among 100 critically ill Patients The results show that there is a steady fall in serum albumin in both groups. However, the fall in non-survivors was more steep than survivors. When mean albumin was compared statistically at different intervals, it was found to be statistically significant.

Conclusion: Serum albumin is a cheap and cost effective and is routinely measured in all critically ill patients. Thus serum albumin serves as a powerful prognostic tool for critically ill patients.

Keywords: serum albumin, critically ill, survivors, non survivors.

Introduction

Albumin is the most abundant plasma proteins in humans. It helps to maintain the colloid osmotic pressure, acts as a carrier protein, and is involved in metabolic, antioxidant and various other functions.

Patients who are admitted in Intensive Care Unit (I.C.U.) are at an increased risk of mortality due to the severity of their illness. It is thus, important to identify the patients at the time of admission who are likely to have a poor outcome, so that such patients

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can be managed aggressively. Serum Albumin appears to be one such prognostic indicator. Its utility as a prognostic indicator has been studied in various contexts including critically ill patients.[2] A low serum albumin (SA) concentration correlates with increase in length of stay in ICU increases the risk of death and even readmission to hospital sooner and more frequently. The daily trend of serum albumin can be useful tool in predicting the weaning capability of patients needing mechanical ventilation. It has been used by many investigators as an index of the nutritional and metabolic status of the patients.

Albumin, a major component of plasma protein, is required to maintain oncotic pressure, micro vascular permeability, acid–base function, and to prevent platelet aggregation.[2] Albumin is the most important contributor to the osmotic colloid pressure. Infact, given its negative charge at normal pH, it retains sodium cations, and therefore water, in the intravascular compartment. It also plays central roles in cellular physiology, including intravascular transport of molecules (like hormones) and lipid metabolism. A dye-binding method is used to measure serum albumin. Once bound to bromocresol, the complex absorbs light at a different wavelength than unbound bromocresol. Bromocresol can also bind to other proteins and thus can lead to an overestimation of albumin levels.[1]

Total daily albumin degradation in a 70 kg adult is around 14 g day^{-1} or 5% of daily whole-body protein turnover. Albumin is broken down in most organs of the body. Muscle and skin break down 40–60% of a dose of labelled albumin. The liver, despite its high rate of protein metabolism, degrades 15% or less of the total. The kidneys are responsible for about 10%, while another 10% leaks through the stomach wall into the gastrointestinal tract.

Albumin concentrations may be a marker for subclinical disease in elderly patients. In studies of hospitalized patients, hypoalbuminemia is associated with increased length of stay, higher complication rates and higher mortality.[3] Albumin level is a strong predictor of many diseases and surgeries, particularly in some critical illnesses, such as sepsis and acute myocardial infarction, and also in critically ill children. Moreover, low serum albumin concentrations in critical illness have been associated with poor outcomes. A meta-analysis of 90 cohort studies with acutely ill patients by Vincent et al. showed that for each 1 g/dL decline in serum albumin concentration there was a significant rise in the odds of mortality by 137%, morbidity by 87%, and prolonged hospital stay by 71%.

Serum albumin is a part of the hepatic function test and is routinely assessed at admission in critical patients. Serum albumin level measurement is simple, less time consuming and easily available. In Indian scenario where there is scarcity of good intensive care units, low doctors to patient's ratio and limitation of financial resources, there is a need for good cost-effective indicator to predict risk of mortality and morbidity.

Materials and Methods

This Hospital based prospective study entitled "**STUDY OF SERUM ALBUMIN AS A PROGNOSTIC MARKER IN CRITICALLY ILL PATIENTS**" was conducted after clearance from Board of Studies and Ethical committee in Muzaffarnagar Medical College, Muzaffarnagar during the period 2019-21. The study population was calculated using G-power software with 80% of power and 5% of significance level. The total sample size was determined to be 100 patients.

Inclusion Criteria:

1. Age > 18 years
2. Critically ill Patients [failure of one or more organs/system or depend on survival from advanced instruments of monitoring and therapy] admitted in MICU of Muzaffarnagar medical college.
3. Patients ready to give and sign informed written consent

Exclusion Criteria:

1. Nephrotic / Nephritic Syndrome
2. Cirrhosis of Liver.
3. Malnutrition
4. Protein losing enteropathy
5. Patients not willing to give informed consent

Methodology

1. Written informed consent was taken from each patient/relative of patient (if pt was not in state to give consent) and study explained.

2. Patients were selected on basis of inclusion and exclusion criterias.

3. Detailed history was taken.

4. Patients assessed clinically on day of admission to MICU.

5. Routine investigations like Hb, WBC, platelet count, RFT, LFT, electrolytes and Serum albumin.

6. Serum albumin level was measured by BECKMAN COULTER ANALYZER using reagents{BROMOCRESOL GREEN AND SUCCINATE BUFFER} on day 1,3,5,7.

7. Radiological investigations like X ray, USG, CT Scan were carried according to need without any cost to patient.

The data was entered into the Microsoft excel and the statistical analysis was performed by statistical software SPSS version 21.0. The Quantitative (Numerical variables) were present in the form of mean and SD and the Qualitative (Categorical variables) were present in the form of frequency and percentage.

The student t-test was used for comparing the mean values (continuous data) between the 2 groups whereas chi-square test was applied for comparing the categorical data (frequency). The p-value was considered to be significant when less than 0.05.

Observations and Results

The present cross- sectional study was conducted in the department of medicine, among 100 critically ill Patients [failure of one or more organs/system or depend on survival from advanced instruments of monitoring and therapy] admitted in MICU.

Table 1: Distribution of the patients based on outcome at the end of the study

Outcome	Number	%
Survivors	80	80
Non survivors	20	20
Total	100	100

Out of 100 subjects, 80 survived while 20 were expired (Table 1)

The mean age of study population was 51.55 ± 16.79 years with a rage of 18-90 years.

The mean age among survivors was 50.91 ± 16.66 years with range of 18-85 years. The mean age among non-survivors was 54.10 ± 17.51 years with range of 21-90 years. There was a significant difference (p = 0.047) between the two groups with higher mean age among non-survivors.

In our study 58% of the subjects were males and 42% were females.

Mortality was reported to be more among males compared to females.

Table 2: Comparison of Serum Albumin (g/dl) Survivors and Non-Survivors

Serum Albumin (g/dl)	Survivors		Non survivors		p value
	Mean	SD	Mean	SD	
Day 1	3.95	0.53	2.88	0.26	0.008*
Day 3	3.51	0.48	2.57	0.21	0.003*
Day 5	3.18	0.37	2.28	0.28	0.003*
Day 7	2.96	0.39	1.98	0.24	<0.01*

When mean albumin was compared statistically at different intervals, it was found to be statistically significant (table 10, graph 10). The results show that there is a steady fall in serum albumin in both groups. However, the fall in non-survivors was more steep than survivors. It suggests that the rapidity with which serum albumin level falls has an effect on the prognosis of the patient in terms of mortality. A steep decline in serum albumin indicates a poor prognosis.

Critically ill patients after have reduced albumin levels due to malnutrition or the Metabolic stress or both. serum albumin appears to be a reliable prognostic indicator in various contexts. A recent

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review suggests that serum albumin could be an independent predictor of mortality in a wide range of clinical & research settings. Large community based studies have shown a link between low serum albumin and an increase in morbidity and mortality. A low serum albumin concentration correlates with increased length of stay in the intensive care unit and with complication rates, such as ventilator depending and the development of new infection. The daily trend of serum albumin can be a useful tool and predicting the capability of patients needing mechanical ventilation.

Discussion

Critically ill patients after have reduced albumin levels due to malnutrition or the metabolic stress or both. serum albumin appears to be a reliable prognostic indicator in various contexts. A recent review suggests that serum albumin could be an independent predictor of mortality in a wide range of clinical & research settings. Large community bared studies have shown a link between low serum albumin and an increase in morbidity and mortality. A low serum albumin concentration correlates with increased length of stay in the intensive care unit and with complication rates, such as ventilator depending and the development of new infection. The daily trend of serum albumin can be a useful tool and predicting the capability of patients needing mechanical ventilation.[4-8]

In the intensive care setting, serum albumin has long been a predictor of each 10-g/L decrease in the serum albumin concentration significantly raised the odds of mortality by 137%.[9] More recent studies including that of 5894 acutely ill adult medical patients have also shown hypoalbuminemia at admission to be an independent marker of 30-day all-cause mortality.[10] the intensive care setting, serum albumin has long been a predictor of poor clinical and surgical outcomes although it is also a reflection of the acute-phase response.[11].

The mean age of study population was 51.55±16.79 years with a rage of 18-90 years. The mean age in survivors was 50.91±16.66 years with range of 18-85 years. The mean age in non-survivors was 54.10±17.51 years with range of 21-90 years.

There was a significant difference (p = 0.047) between the two groups with higher mean age among non-survivors. These results were in accordance with study done by Mahajan S et al[12] i.e. The mean age of survivors was 47.8±21.7 years and that of non-survivors was 62.3±13.1 year.

In present study, among survivor group, 61.3% patients have normal serum albumin levels on admission as compared to just 35.0% in the non-survivor group, suggesting hypoalbuminemia at admission indicates a poorer prognosis in terms of increased mortality. (p=<0.001) In our study, the mean serum albumin level at day 1 was 3.49±0.49, day 3 was 3.42±0.49, day 5 was 2.84±0.49 and day 7 was 2.65±0.49. The mean serum albumin level at day 1 day 3 day 5 and day 7 was significantly more among survivors (3.95±0.53,3.51±0.48,3.18±0.37 and 2.96±0.39 respectively) compared to non survivors (2.88±0.26, 2.57±0.21, 2.28±0.28 and 1.98±0.24 respectively). In the study by *Sarvanakumar et al,*[13] mean level of serum albumin at day 1 was 3.72 g/dl (+ 0.278) in survivor group and in non survivors group, it was 3.11 g/dl (+ 0.247). The difference in mean serum albumin in day 1 was statistically significant In a study by Nirmala *et al* (2015[14], slightly higher serum albumin was detected in Survivors versus non-survivors on day 1 (3.46 ± 0.25 vs. 3.44 ± 0.30), but the variance was statistically not significant. In a study by Sanket Mahajan et al,[12] mean serum albumin level on day of admission (Day 1) for the study group was 3.3 g/dl (± 0.4 g/dl). In survivors, it was 3.4 g/dl (± 0.4 g/dl) and in non-survivors it was 3.1 g/dl (± 0.19 g/dl). It was significantly lower (p = 0.003) in non-survivors. A study done by Gosavi et al [15] also showed the mean Serum albumin on day of admission in survivors and non-survivors was 3.06 gm% (+/-0.54) and 2.45 gm% (+/-0.50) (p< 0.01). In the study by *Sarvanakumar et al*, [13] the mean level of serum albumin at day 3 was 3.17 g/dl (+ 0.248) in survivor group and in non-survivors group, it was 2.65 g/dl (+ 0.172). The difference in mean serum albumin in day 3 was statistically significant.

While the association between low albumin levels and ICU mortality have been demonstrated in this and other studies, a key question for clinicians treating critically ill patients is whether this finding is indicative of causation or association. While albumin

supplementation is used in clinical practice, there is little evidence to support this practice. The Albios trial failed to show a benefit of supplemental albumin in patients with sepsis and septic shock.[16]

Recommendations from *Vincent et al.* [9] stated that albumin administration, although unlikely to cause harm in most patients, should be reserved for use in specific groups of patients in whom there is evidence of benefit. Currently, it is unclear which, if any, groups of patients will benefit from albumin therapy. Future studies need to focus on identifying patients who will benefit from albumin therapy, determining if there are albumin cut-offs that may identify patients who would benefit from albumin therapy, determine the dosage of albumin solution and identify appropriate albumin level targets that are needed to improve outcomes.The performance of serum albumin as an individual biomarker is not adequate to triage patients, and this highlights the complex multifaceted nature of outcome prediction in critical care. Serum albumin may, however, play a role in future outcome prediction models that may be developed in the SA setting, and further research should be conducted to explore this premise. The use of serum albumin at appropriate clinical cut-offs to direct specific therapy (e.g. albumin therapy) should also be explored.

Summary and Conclusion

Out of 100 subjects, 80 survived while 20 were expired..In the survivor group 61.3% patients have normal serum albumin levels on admission as compared to just 35.0% in the non-survivor group, suggesting hypoalbuminemia at admission indicates a poorer prognosis in terms of increased mortality. The results show that there is a steady fall in serum albumin in both groups. However, the fall in non-survivors was more steep than survivors. The strongest predictor of outcome of the patient is serum albumin on day three with highest (odds ratio 35.12).The average duration of hospital stay was significantly longer in survivors as compared to non-survivors (p=0.007).

Critically ill patients have higher mortality rates. Early recognition of patients at high risk of poor outcome can prompt more aggressive management to improve their survival. Serum albumin is a cheap and cost effective and is routinely measured in all critically ill patients. Serial assessment of serum albumin provides useful prognostic information in critically ill patients. Serum albumin on day 3 correlated directly with higher mortality in Critically Ill patients. Serum albumin thus serves as a simple but powerful prognostic tool for critically ill patients.

"**STUDY OF SERUM ALBUMIN AS A PROGNOSTIC MARKER IN CRITICALLY ILL PATIENTS**" was conducted after clearance from Board of Studies and Ethical committee in Muzaffarnagar Medical College, Muzaffarnagar during the period 2019-21.

References

1. Sung J, Bochicchio GV, Joshi M, Bochicchio K, Costas A, Tracy K, etal. Admission serum albumin is predicitve of outcome in critically ill trauma patients. Am Surg. 2004 Dec;70(12):1099-102.

2. Limaye K, Yang JD, Hinduja A. Role of admission serum albumin levels in patients with intracerebral hemorrhage. Acta Neurol Belg. 2016 Mar;116(1):27-30.

3. Finestone HM, Greene-Finestone LS, Wilson ES, Teasell RW. Prolonged length of stay and reduced functional improvement rate in malnourished stroke rehabilitation patients. Arch Phys Med Rehabil. 1996 Apr;77(4):340-345.

4. Waydhas C. Intrahospital transport of critically ill patients. Crit Care. 1999;3(5):83-89.

5. Blunt MC, Nicholson JP, Park GR. Serum albumin and colloid osmotic pressure in survivors and non-survivors of prolonged critical illness. Anaesthesia 1998;53:755- 761.

6. Goldwasser P, Feldman J. Association of serum albumin and mortality risk. J Clin Epidemiol. 1997 Jun;50(6):693-703.

7. Klonoff-Cohen H, Barrett-Connor EL, Edelstein SL. Albumin levels as a predictor of mortality in the healthy elderly. J Clin Epidemiol. 1992 Mar;45(3):207-212.

8. Murray MJ, Marsh HM, Wochos DN, Moxness KE, Offord KP, Callaway CW. Nutritional assessment of intensive-care unit patients. Mayo Clin Proc. 1988 Nov;63(11):1106-1115.

Anju Mittal, Bhawana Sharma, Atul Kumar et. al. / Study of
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9. Vincent JL, Dubois MJ, Navickis RJ, Wilkes MM. Hypoalbuminemia in acute illness: is there a rationale for intervention? A meta-analysis of cohort studies and controlled trials. Ann Surg. 2003 Mar;237(3):319-334.

10. Jellinge ME, Henriksen DP, Hallas P, Brabrand M. Hypoalbuminemia is a strong predictor of 30-day all-cause mortality in acutely admitted medical patients: a prospective, observational, cohort study. PLoS One. 2014 Aug 22;9(8).

11. Singer P, Blaser AR, Berger MM, Alhazzani W, Calder PC, Casaer MP et al. ESPEN guideline on clinical nutrition in the intensive care unit. Clin Nutr. 2019 Feb;38(1):48-79.

12. Mahajan S, Agrawal A. Estimation of Serial Serum Albumin Levels as Prognostic Marker in Critically Ill Patients Admitted in Medical ICU-A Cross-Sectional Study. International Journal of Health Sciences & Research 2015;5(11):31-37.

13. Saravanakumar G, Balasubramaniyan S, Paari N. Estimation of Serial Serum Albumin Level as a Prognostic Marker in Sepsis Patients Admitted in Intensive Care Units. JMSCR. 2020;08(11):526-531.

14. Nirmala AC, Namratha, Avinash BH. A study of serial estimations of serum albumin as a prognostic marker. International Journal of Basic and Applied Medical Sciences 2015;5(1):228-234.

15. Gosavi S, Shinde P. Serum Albumin: A Prognostic Marker in Critically Ill Patients. IJSR.2016;5(5):207-209.

16. Caironi P, Tognoni G, Masson S, et al. Albumin replacement in patients with severe sepsis or septic shock. New Engl J Med 2014;370(15):1412-1421.

Psychosocial and Behavioral Problems of Children and Adolescents in the Early Stage of Reopening of Schools after the Covid-19 Pandemic: A National Cross-Sectional Study in U. P.

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Abstract

This study aims to explore the psychosocial and behavioral problems of children and adolescents in the early stage of reopening schools. In this national cross-sectional study, a total of 11072 students from U.P were naturally divided into two groups based on their schooling status: reopened schools (RS) and home schooling (HS) group. The psychosocial and behavioral functioning were measured by Achenbach Child Behaviour Checklist (CBCL) and compared in these two groups. Multivariable logistic regression analyses were conducted to explore the independent predictors associated with the psychosocial and behavioral problems. Our results showed that the students in the RS group had more adverse behaviors than that of HS group. The RS group had the higher rates of parent-offspring conflict, prolonged homework time, increased sedentary time and sleep problems (all $p < 0.001$). When separate analyses were conducted in boys and girls, the RS group had the higher scores for (1) overall behavioral problems ($p = 0.02$ and $p = 0.01$), internalizing ($p = 0.02$ and $p = 0.02$) and externalizing ($p = 0.02$ and $p = 0.004$) behaviors in the 6–11 age group; (2) externalizing ($p = 0.049$ and $p = 0.006$) behaviors in the 12–16 age group. Multivariable regression showed parent-offspring conflict and increased sedentary time were the most common risk factors, while physical activity and number of close friends were protective factors for behavioral problems in RS students ($p < 0.01$ or 0.05). The present study revealed that students' psychosocial and behavioral problems increased in the early stage of reopening of schools unexpectedly. These findings suggest that close attention must be paid and holistic strategies employed in the school reopening process of post-COVID-19 period.

Keywords: Adolescents, Youth self report, behavioural and emotional problems and screening.

Introduction

In the past year, the world saw the coronavirus disease (COVID-19) outbreak affect countries in waves more widespread on a global scale than SARS and other epidemics[1,2,3]. According to the official website of the World Health Organization, more

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than 17,000,000 people have been confirmed to have COVID-19 globally as of July 31, 2020[4]. To better fight against the epidemic, social distancing measures have been implemented in many countries to ease the burden on health systems. Most governments around the world have temporarily closed educational institutions in an attempt to contain the spread of the COVID-19 pandemic, thereby impacting over 60% of the world's student population[5].

A nationwide closure of educational institutions was first implemented as an emergency measure in INDIA in February 2020. In order to mitigate the negative consequences on students during home confinement, the government, National Health Commission, medical health specialists, schools and parents worked together to provide activities to maintain routines and distract children from the harsh reality of the epidemic[6,7,8,9]. Meanwhile, online services to help the public cope with mental health issues were implemented in a large number of cities[7,10,11]. Measures undertaken to further minimize adverse social-emotional effects of school closures included increased offerings for parent-offspring activities, a reduction in academic load, and a shift in the routine communication of daily life from the schools to the online class clusters in home schooling programs[12,13].

Many studies have shown the adverse aspects of school closure and assumed that resumption of in-person schooling would end these negative impacts on the psychosocial well-being of children and adolescents[14,15]. Despite attention to the mental health impact of school closures and stay at home orders, no research has described psychosocial and behavioral effects of returning to schools after prolonged home confinement and online schooling.

Since COVID-19 was contained in late spring to summer 2020, the schools have been entering the reopening phase since April 2020 following the principle of "No new COVID-19 cases diagnosed over the previous 21 days in communities free of the disease" from the national and local Centres for Disease Control and Prevention based on the incubation period of this virus[16,17,18]. As the timetable of schools reopening varies according to the guidelines set by each city, we have had the rare opportunity to

observe the psychosocial and behavioral problems of children and adolescents in the early period of reopening schools after the COVID-19 pandemic compared to that of continued home schooling.

Materials and Methodology

This is a national cross-sectional study of INDIAN students from primary, junior and high schools performed via an online survey running from May 20 to June 13, 2020. This survey period corresponds to the end stage of school closure and the reopening of schools throughout the country after the containment of COVID-19.

The study was prospectively sponsored by the Subspecialty Group of Developmental and Behavioral Paediatrics, the Society of Paediatrics, on April, when the COVID-19 epidemic was nearly controlled and cities were ready to resume typical activities after a long-term lockdown. The study population was selected according to geographical regions (North, East, West, South and Middle). The capital city with the largest population and a capital city geographically in the center of the region were selected to form a representative sample of the population. One primary, one junior and one high school were selected resulting in a pool of eligible regular public schools that were of a medium-size based on public information, contained at least 1000 pupils, had no more than 60% of pupils of the same sex and were active for more than ten years in the urban and rural areas of the district. In order to reach the necessary sample size, two classes were randomly selected from each grade level of the urban and rural schools.

Observations and Results

Nationwide, a total of 12,382 participants from five geographic regions were enrolled in the survey. The cities of eastern U.P were excluded from the survey because they did not reach the necessary sampling size. Of the remaining 12,261 participants from 40 schools (8 were junior and senior combined high schools), a total of 11,072 (90.3%) valid questionnaires were obtained after removing 254 responses with suspect answers (contradictions and/or inconsistencies) and 935 responses that were outside the age range (>16 years). The Cronbach's α

were above 0.7 for all subscales (except the sexual problem in age 6–11 is 0.571) for both sexes in our sample, indicating acceptable internal consistency.

Psychosocial features of RS and HS group

The RS group showed a higher prevalence rate for parent-offspring conflict (67.9 vs. 63.6%, $p < 0.001$), prolonged homework time (>2h per day) (44.8 vs. 36.0%, $p < 0.001$), increased sedentary time (>6 hours per day) (30.7 vs. 25.2%, $p < 0.001$), sleep problems (30.8 vs. 27.4%, $p < 0.001$), as well as physical inactivity time (≤1 hour per day) (58.2 vs. 41.3%, $p < 0.001$) than the HS group, as described.

Behavioral characteristics by group for students age 6–11

The RS group had a significantly higher CBCL overall score for problem behaviors compared to that of the HS group for both sexes (16.79 vs. 14.87, $p = 0.02$ and 13.61 vs. 11.62, $p = 0.01$ respectively). Both the internalizing and externalizing behavior scores of the RS group were higher than the HS group in boys (8.34 vs. 7.14, $p = 0.02$ and 8.79 vs. 7.87, $p = 0.02$, respectively) and in girls (5.58 vs. 4.73, $p = 0.02$ and 7.17 vs. 6.07, $p = 0.004$ respectively). The difference in each subscale for both sexes between the RS group and HS group were detailed.

Behavioral characteristics by group for students age 12–16

The RS group had a significantly higher CBCL score than the HS group for the two externalizing behaviors for both sexes, which resulted in a significantly higher externalizing score for the RS group than the HS group in both boys (9.42 vs. 8.35, $p = 0.049$) and girls (6.20 vs. 5.11, $p = 0.006$).

Risk factors of psychosocial and behavioral problems in RS and HS group

Independent variables which were significantly associated with behavioral problems (as measured by total score of overall behavioral problems across sex and age subgroups) in RS and HS group respectively. The parent-offspring conflict and increased sedentary time were the most common risk factors, while physical activity and number of close friends were protective factors in RS group ($p < 0.01$ or 0.05). In the HS group, physical inactivity and screen exposure time were risk factors ($p < 0.01$ or 0.05).

Discussion

This study reports the overall psychosocial and behavioral impact on children and adolescents of long-term home confinement and the early stage of reopening schools during the COVID-19 pandemic. The reopening of schools at different times set by local education departments across the country provided an opportunity to evaluate the behavioral impact on children and adolescents over the naturally occurring course of reopening schools versus continued home schooling. To our knowledge, this study is the first national cross-sectional survey to explore the psychosocial impact of reopening schools after long-term home confinement and online schooling, including the identification of risk and protective factors during these two phases. Our findings highlight the need for vigilance regarding the psychological needs of children and adolescents after as well as during epidemics, and may provide key knowledge needed to formulate post-COVID-19 recovery strategies.

Compared with the HS group, the RS group showed higher rates of parent-offspring conflict, prolonged homework time, increased sedentary time, sleep problems, as well as physical inactivity. Moreover, the RS group displayed higher emotional and behavioral problem scores as well as positive detection rate than those of HS group unexpectedly. The scores of the RS group were higher than those of the HS group in both internalizing and externalizing behavior problems for both sexes in the children aged 6–11 years and for two externalizing behavior subscales for both sexes in adolescents aged 12–16 years. Specifically, children aged 6–11 who returned to school showed more depression, compulsive behavior and hyperactivity, while adolescents of age 12–16 showed more aggressive behavior, compared to those who were home schooled. Of note, our finding of increased social-emotional problems for children in the RS group compared to the HS group is consistent with those of a recent study of adults, which showed increased psychological problems for medical imaging workers during the late/reopening stage of the epidemic[21]. Our study also identified risk and protective factors for behavior issues in children and

adolescents whose schools reopened. Multivariable regression showed that parent-offspring conflict, increased screen exposure time and sedentary time were linked to an increased odds of the CBCL total behavioral score exceeding the threshold for clinical significance in the RS group, while physical activity and number of close friends were the most common protective factors among RS students.

As COVID-19 is much more widespread than other epidemics and has affected countries in waves, the impact of school closures across the world has been more extensive and felt more profoundly than in other recent infectious disease outbreaks[22,23,24]. Previous studies have demonstrated that in addition to the increase in clinging, inattentive and irritable documented at the beginning of the epidemic, with its link to disrupted school and daily routine, poor dietary habits (obesity), increased use of electronic devices, can further aggravate adverse effects on children and adolescents[25,26,27]. School reopening was assumed to be the most effective measure for alleviating the negative effects of home quarantining and improving the psychosocial well-being of children[28,29]. However, contrary to our expectation, our study showed that the psychosocial behavioral problems in the early stage of school reopening were still present and, in fact, students in the RS group exhibited more psychological problems across most CBCL subscales than that of the HS group. There may be the potential explanations for this phenomenon. However, when transitioning back to in-person school, children may react negatively to the re-imposition of rapid increase in academic pressure from parents and teachers, and may have more peer relationship problems, as well as difficulties adjusting to the changed daily school schedule. The reduced academic load during home schooling likely necessitated increased study once schools reopened to make up for the lost months and allow them to complete entire semester courses before mid-July, potentially resulting in excessive homework and restrictions on extra-curricular recreational activities.

Conclusion

We found that the psychological and behavioral symptoms documented among children and adolescents during the home school phase of the COVID-19 pandemic did not decrease as expected in the early stage of school reopening. This unexpected phenomenon observed at a unique time in human history will help us better understand the most important psychological needs of children and adolescents. These findings suggest that the mental health vulnerability does not spontaneously resolve with virus control. Rather, the early phase of school reopening remains an extremely challenging period for children and adolescents, requiring attention and collaboration from schools, families, mental health providers and policy-makers to protect the mental health of children and adolescents in the post-COVID-19 period. Since physical health, mental health, and productivity in adult life are deeply rooted in childhood psychosocial experience and environmental exposures, more research is also necessary to incorporate the voices of children and their families when developing holistic strategies to prevent long-term consequences of the COVID-19 pandemic for the world's children.

References

1. Wang C, Horby PW, Hayden FG, Gao GF. A novel coronavirus outbreak of global health concern. The lancet. 2020 Feb 15;395(10223):470-3.

2. Li Q, Guan X, Wu P, Wang X, Zhou L, Tong Y, Ren R, Leung KS, Lau EH, Wong JY, Xing X. Early transmission dynamics in Wuhan, China, of novel coronavirus–infected pneumonia. New England journal of medicine. 2020 Jan 29.

3. Wang L, Zhang Y, Chen L, Wang J, Jia F, Li F, Froehlich TE, Hou Y, Hao Y, Shi Y, Deng H. Psychosocial and behavioral problems of children and adolescents in the early stage of reopening schools after the COVID-19 pandemic: a national cross-sectional study in China. Translational psychiatry. 2021 Jun 3;11(1):1-2.

4. Edmunds WJ. Finding a path to reopen schools during the COVID-19 pandemic. The Lancet Child & Adolescent Health. 2020 Nov 1;4(11):796-7.

5. Brooks SK, Webster RK, Smith LE, Woodland L, Wessely S, Greenberg N, Rubin GJ. The psychological

impact of quarantine and how to reduce it: rapid review of the evidence. The lancet. 2020 Mar 14;395(10227):912-20.

6. Wang L, Zhang Y, Chen L, Wang J, Jia F, Li F, Froehlich TE, Hou Y, Hao Y, Shi Y, Deng H. Psychosocial and behavioral problems of children and adolescents in the early stage of reopening schools after the COVID-19 pandemic: a national cross-sectional study in China. Translational psychiatry. 2021 Jun 3;11(1):1-2.

7. Wang, G. H., Zhang, Y. T., Zhao, J., Zhang, J. & Jiang, F. Mitigate the effects of home confinement on children during the COVID-19 outbreak. Lancet 395, 945–947 (2020).

8. Xu TL, Ao MY, Zhou X, Zhu WF, Nie HY, Fang JH, Sun X, Zheng B, Chen XF. China's practice to prevent and control COVID-19 in the context of large population movement. Infectious diseases of poverty. 2020 Aug 1;9(04):121-34.

9. Wei H, Chen L, Qian Y, Ke XY, Chen Q, Li Y. Psychological impact of coronavirus disease 2019 on children and adolescents and recommendations for family intervention (1st version). Chin. J. Child Health Care. 2020;28:373-84.

10. Liu S, Yang L, Zhang C, Xiang YT, Liu Z, Hu S, Zhang B. Online mental health services in China during the COVID-19 outbreak. The Lancet Psychiatry. 2020 Apr 1;7(4):e17-8.

11. Wang L, Zhang Y, Chen L, Wang J, Jia F, Li F, Froehlich TE, Hou Y, Hao Y, Shi Y, Deng H. Psychosocial and behavioral problems of children and adolescents in the early stage of reopening schools after the COVID-19 pandemic: a national cross-sectional study in China. Translational psychiatry. 2021 Jun 3;11(1):1-2.

12. Wang G, Zhang Y, Zhao J, Zhang J, Jiang F. Mitigate the effects of home confinement on children during the COVID-19 outbreak. The Lancet. 2020 Mar 21;395(10228):945-7.

13. Cluver L, Lachman JM, Sherr L, Wessels I, Krug E, Rakotomalala S, Blight S, Hillis S, Bachman G, Green O, Butchart A. Parenting in a time of COVID-19. Lancet. 2020 Apr 11;395(10231).

14. Jiao WY, Wang LN, Liu J, Fang SF, Jiao FY, Pettoello-Mantovani M, Somekh E. Behavioral and emotional disorders in children during the COVID-19 epidemic. The journal of Pediatrics. 2020 Jun 1;221:264-6.

15. Yang Y, Cao M, Cheng L, Zhai K, Zhao X, De Vos J. Exploring the relationship between the COVID-19 pandemic and changes in travel behaviour: A qualitative study. Transportation Research Interdisciplinary Perspectives. 2021 Sep 1;11:100450.

16. Wang L, Zhang Y, Chen L, Wang J, Jia F, Li F, Froehlich TE, Hou Y, Hao Y, Shi Y, Deng H. Psychosocial and behavioral problems of children and adolescents in the early stage of reopening schools after the COVID-19 pandemic: a national cross-sectional study in China. Translational psychiatry. 2021 Jun 3;11(1):1-2.

17. Martelletti L, Martelletti P. Air pollution and the novel Covid-19 disease: a putative disease risk factor. SN comprehensive clinical medicine. 2020 Apr;2(4):383-7.

18. Martelletti L, Martelletti P. Air pollution and the novel Covid-19 disease: a putative disease risk factor. SN comprehensive clinical medicine. 2020 Apr;2(4):383-7.

19. Xin RE, Tang HQ, Zhang ZX. Investigate on 24013 city children's behavioral problems in 26 units of 22 provinces. Shanghai Arch Psychiatry. 1992;4:47-55.

20. Li W, Mao X, Li J, Fang L, Du G, Qiao J, Jia X. Anxiety and depression among imaging doctors in post-COVID-19 period. SN Comprehensive Clinical Medicine. 2020 Dec;2(12):2595-9.

21. Sprang G, Silman M. Posttraumatic stress disorder in parents and youth after health-related disasters. Disaster medicine and public health preparedness. 2013 Feb;7(1):105-10.

22. Fantini MP, Reno C, Biserni GB, Savoia E, Lanari M. COVID-19 and the re-opening of schools: a policy maker's dilemma. Italian journal of pediatrics. 2020 Dec;46(1):1-3.

23. Child TL. Pandemic school closures: Risks and opportunities. The Lancet. Child & Adolescent Health. 2020 May;4(5):341.

24. Child TL. Pandemic school closures: Risks and opportunities. The Lancet. Child & Adolescent Health. 2020 May;4(5):341.

25. Jackson AM, Mullican LA, Tse ZT, Yin J, Zhou X, Kumar D, Fung IC. Unplanned Closure of Public Schools in Michigan, 2015-2016: Cross-Sectional Study on Rurality and Digital Data Harvesting. Journal of School Health. 2020 Jul;90(7):511-9.

26. Hawryluck L, Gold WL, Robinson S, Pogorski S, Galea S, Styra R. SARS control and psychological effects of quarantine, Toronto, Canada. Emerging infectious diseases. 2004 Jul;10(7):1206.

27. Decosimo CA, Hanson J, Quinn M, Badu P, Smith EG. Playing to live: outcome evaluation of a community-based psychosocial expressive arts program for children during the Liberian Ebola epidemic. Global Mental Health. 2019;6.

Emotional and Behavioural Problems in School Going Children (5-16 years) in and around Meerut

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Abstract

Background: Adolescents are highly vulnerable to psychiatric disorders. This study aimed to explore the prevalence and patterns of behavioural and emotional problems in adolescents. It was also aimed to explore associations between socioenvironmental stressors and maladaptive outcomes.

Method: A school based cross-sectional study was conducted between January and July 2008. A stratified random sampling was done. 1150 adolescents in 5-16 years age group in grades 7 to 12 in 10 co-educational schools (government run and private) were the subjects of the study. Behavioural and emotional problems were assessed using Youth Self-Report (2001) questionnaire. Family stressors were assessed using a pre-tested 23 item questionnaire. Univariate and multivariate analysis were performed. Multiple logistic regression analysis was also done.

Results: Prevalence of behavioural and emotional problems in adolescents was found to be 30%, with girls exceeding boys in all age groups. Internalizing syndrome was the most common (28.6%) psychiatric problem. On stepwise regression analysis, a perceived lack of emotional proximity to mother had the highest odds (3.489) followed by addiction in father (2.642) and marital discord in parents (1.402). Type of school, type of family, socioeconomic status, relationship with father, mother&s employment and educational status were not found to be significantly associated.

Conclusion: An alarming number of our adolescents suffer from emotional and behavioural problems which have their roots in the family environment. These data suggest urgency in establishing a school based mental health service.

Keywords: Adolescents, Youth self report, behavioural and emotional problems and screening.

Introduction

Adolescence is marked by immense turmoil in emotional and behavioural spheres.[1] W H O defines adolescence as the period of life between the ages of 10-to 19 years.[1] The adolescent struggles to develop

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his individuality while still conforming to societal norms[2]. Rapid urbanization and modernization have exposed them to changes in society. The resultant breakdown in family structure, excessive or minimal control confuses the adolescent and makes him/her especially vulnerable to maladaptive patterns of thinking and behavior[3]. Healthy adulthood depends upon successful resolution of these emotional and behavioural problems.[4] Treading on this tightrope, most adolescents go through to adulthood normally. All adolescents may not be so fortunate, to get the ideal societal support for this smooth transition. Some develop maladaptive patterns in emotional and behavioural spheres. This augers ill for the individual's future resulting in depression, delinquency and suicides among other problems.[5]

Of late there has been a rise in the prevalence of mental illness and maladaptive behaviours among adolescents[4]. WHO estimate shows that up to 20% adolescent have one or more mental or behavioural problems[4]. Studies conducted in different parts of the world show that prevalence of behavioural and emotional problems in adolescents ranges from 16.5%[5] to 40.8%[6] and in India it is in the range of 13.7%[7] to 50%[8]. As adolescents form one fifth of India's population[9], this means a sizable disease burden on the society. Lack of data on the subject precludes an assessment of the magnitude of the problem which is essential for effective health care planning. This study has been planned to assess prevalence and pattern of maladaptive behavioural and emotional problems among school going adolescents. The association between socio-environmental factors and the emotional and behavioural problems in this age group was also studied.

Materials and Methodology

Only high schools and higher secondary schools were taken for the study. As per data collected from office of director of education, area has 130 schools in the category of high schools and higher secondary schools catering to a total of 23696 students. To ascertain similar environment for boys and girls, only co-educational schools (n=114) were taken up for the study and boys-only or girls- only schools were excluded (n=16). Among co-educational schools, 87 were government and 27 were private schools with a total number of 16700(70%) and 6996(30%) students respectively. Students of government and private schools represent different socioeconomic strata due to high cost of education in private schools. Hence, students from both types of schools were included in the study.

Literature review indicated that the prevalence rate of emotional and behavioural problems among adolescents in India ranges from 13.7% to 50%[7]. Since no such figure is available, the required sample size was calculated presuming prevalence of 27.28% (median of reported prevalence worldwide). At this level of disease prevalence, the required sample size came out to be 1088. Assuming a non response rate of 10% it was planned to include a sample of 1200 students.

The study population was selected by stratified random sampling. The number of students in government and private strata was selected by probability proportionate to size (PPS) sampling technique. 850 students from government schools and 350 students from private schools were taken for the study. A list of all the government and private co-educational school was prepared and 7 government and 3 private schools were randomly selected to get the required sample size. An average of 120 students was taken from each of the selected schools. For equal representation of all the classes from 7th to 12th, 20 students were taken from each class. To meet the required sample size only one section of each class was selected for the study. These students were selected by simple random sampling.

Observations and Results

The study was conducted from January 2008 to July 2008. 1150 school- going adolescents in 12 to 18 year age group participated in the study. 50 students refused to participate. Responses of 27 students were excluded due to omission of more than 8 problem item in YSR. Thus, 1123 respondents (516 girls and 607 boys) were the subjects for the study. The study shows that the overall prevalence of behavioural and emotional problems across age and sex categories was 30.4%. There was a significant increasing trend in prevalence from onset of adolescence till 17 years of age after which a decline was noted.

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In the present study, a higher prevalence of behavioural/ emotional problems (33.7%) was observed in adolescent girls as compared to boys (27.5%). Also, whereas prevalence in boys shows a peak around 14-15 years followed by a steady decline to 26.3% by 18-19 years of age, girls show a continuous rise in psychiatric problems with age, 43% girls having problems by 18-19 years.

On analysis of pattern of emotional and behavioural problems in adolescents, it was found that internalizing syndrome (28.6%) was the most common problem amongst them followed by the neither internalizing nor externalizing (19.5%) group. In internalizing group, most (22.08%) of the students were noted to be anxious/ depressed. Social problem was observed to be the most frequent (9.3%) among neither internalizing nor externalizing group. Aggressive behaviour was the commonest (11.8%) among externalizing group. Internalizing problems mainly anxiety and depression were commoner in females than males. 24.8% females were anxious / depressed compared to 19.7% males. More boys (18.4%) than girls (12%) were found to suffer from externalizing disorders. 13.3% males had aggressive behavioural problem as compared to 9.7 % females.

Problem of rule braking or delinquency was twice more in boys as compared to girls. On assessing the association of various socio-environmental factor and emotional and behavioural problem among adolescents it was observed that the children of parents with addiction of alcoholism or illicit drugs, developed up to three times as many behavioural and emotional problems as compared to children of parents without addiction. Parents who were consuming six or more standard drinks in one sitting at least once a week were considered as addicted to alcohol.[12]

These problems were more (41%) among physically abused adolescents. Chronic illness in adolescents was also identified to be significantly related to problem under study. Although only 3% students in our study had chronic/debilitating illness but amongst them 73.5% suffered from the psychiatric problem as compared to their healthy counterparts (31%).

The questionnaire tested the student's perception of his academic performances as well as their parents' perception about the same. 75% of the adolescents who thought they were academically poor were found to be suffering from behavioural/emotional problems. 43% of the adolescents who thought that their parents were unhappy with their studies had developed the above mental health problem. On univariate and multivariate analysis, both of these factors were found to be significantly related to behavioural and emotional problems (p< 0.001). Significantly more (34.4%) adolescents belonging to families with marital discord were found to be suffering from behavioural and emotional problems as compared to adolescents of families with good inter-parent relationship.

Adolescents who perceived that they are not loved enough by their mothers showed behavioural and emotional problems twice more than those who felt loved by their mothers. This difference was found to be highly significant both on univariate and multivariate analysis. (p< 0.001).Adolescents with low self esteem (30.7%) as judged from their opinion about their appearance, academic performance and overall opinion about self suffered more(65%) behavioural and emotional problems as compared to those who did not report feelings of low self esteem(14%).

Factors like type of school, type of family, socio-economic status, mother&s employment status, presence of chronic illness in family members, educational status of mother and relationship with father were not found to be significantly associated with behavioural and emotional problems.

The final model of Multiple Logistic Regression analysis showed seven important independent factors which have strong association with behavioural and emotional problems. *Relationship with mother* had the highest odds (3.489) followed by *addiction in father* (2.642) and *interparent relationship* (1.402).

Discussion

In the present study, the prevalence of behavioural and emotional problems among 12 to 18 years school- going adolescents was found to be 30.4%. Robert & s et al in a meta-analysis of 52 studies done in 20 countries of the world, found that

prevalence of psychopathology among adolescents (12 to 18 years) varies from 6% to 41%[6]. In a study on school-going adolescents of Delhi, 50% of the students were found to have problems of emotional maladjustment[9]. Similar study done in adolescents of Bangalore city reported that 20% of the children had psychiatric problems[13]. Thus a third of our adolescents, by even the most conservative estimate, are suffering silently without even being recognized, except for some localized studies.

The morbidity pattern was found to be different in males and females. The prevalence in boys dropped after 17 years but it continued to rise among girls. The rise in emotional and behavioural problems from 12 years up to 17 years is reported in previous studies[7]. Further rise in prevalence of behavioural and emotional problems with age among girls, who are known to have puberty an average of 2 years before boys hence have more years of adjustment to somatic problems, is intriguing. It seems that gender biases and imposition of restrictions on Indian girls have led to rise in psychiatric problems with age.

We report here that 75% of students feeling that they lag behind in their studies (23% of study subjects), have emotional and behavioural problems. Other authors have also reported that achievement pressure was an important factor in causation of psychiatric problems.[14]

An interesting finding in our study is the relation of adolescents' bonding with his mother and prevalence of behavioural and emotional problems. This applied to both sexes of adolescents. Adolescents' perception of a secure bonding with the mother was found to be significantly associated with the problem under study but no significant difference in prevalence of the same was found among boys and girls when the bonding with mother was insecure. We can therefore infer that a loving family with marital harmony protects against mental ill health. However relationship between father and adolescent was not found to be significantly associated with the problem under study. Various other researchers have also emphasized the importance of the adolescents' relationship with mother. Palosaari et al[16] found that girls who had good bonding with their mothers had high self esteem and therefore lesser psychiatric

problems. Lack of ability to talk to the mother, has been shown to be significantly associated with development of depression in children of 12 to 17 years of age[18]. This affects the female child more than male child.

In the present study, parental discord was found to be related with emotional and behavioural problem among adolescent. Inter-parent conflict has been reported to be a factor significantly related to suicide among adolescents by many authors[17]. They have also found that 16-year-old adolescents of divorced parents had more somatic complaints and lower self-esteem than children of intact families.[18]

Our study has a few important limitations. Multi informant studies comprising of responses of parents (Child Behaviour Checklist), teachers (Teacher Report Form), and the adolescent himself (YSR), with cross informant comparisons are ideal for screening for mental health of the propositus[11] followed by psychiatric clinical evaluation[3] for a definitive diagnosis.

Adolescence is characterized by self doubt, concealment and modification of fact which is known limitation of all self reported questionnaire based studies. Questionnaire still form any important part of population based study and is a valuable screening tool.

Conclusion

A sizeable population of our adolescents need support in coping with emotional and behavioural problems. Though many children of families with problems may be normal, knowledge of the family environment and problems in the adolescents-identifies the adolescent-family dyad that may need attention. It indicates towards the need for a multipronged intervention to prevent these problems in adolescents. School based mental health services can handle the problem in most effective way by providing help to the sufferers at earliest. It also seems imperative to have a post of counsellor in every school. The academic achievement and assistance for the same may also be required as that is found to be an important determinant. A community intervention for addiction may also be required and school can become the base using innovative programs like

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student drama club, street plays etc. thus educating the family as well as the school children against addiction too.

Declaration of Ethical clearance- Taken from ethical committee of institute

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Conflict of Interest – Nil

References

1. Rutter M, Graham P, Chadwick O, Yule W.. Adolescent turmoil: fact or fiction J Child Psychol Psychiatry. 1976;17:35–56.

2. Steinberg D. Basic Adolescent Psychiatry. Oxford:Blackwell Scientific Publications. (1sted.) 1987

3. Sadock VA, Sadock BJ. Kaplan and Sadock's Comprehensive textbook of Psychiatry. 7th ed. Philadelphia, USA:: Lippincot Williams and Wilkins Publishers;; 2000. pp. 2903–2954.

4. The World Health Report 2001. Mental Health:New Understanding, New Hope. Geneva, World Health Organization;: 2001. pp. 39–44.

5. Robert E R, Attkinson C, Rosenblatt A. Prevalence of psychopathology among children and adolescents. Am J Psychiatry. 1998;155(6):715–724.

6. Jenson PS, Watanabe HK, Richters JE, Cortes R, Roper M, Liu S. Prevalence of mental disorder in military children and adolescents: finding from a two stage community survey. J Am Acad Child Adolesc Psychiatry. 1995;34:1514–1524.

7. Mishra A, Sharma AK. A clinico-social study of psychiatric disorders in 12-18 years school going girls in urban Delhi. Indian J Community Med. 2001;26(2):71–75.

8. Belfer ML, Sharma AK. Child and adolescent mental health around the world: Challenges for progress. J.Indian Assoc. Child Adolesc. Ment. Health. 2005;1:31–6.

9. International Institute for population sciences (IIPS) and Macrointernational. 2007. National Family Health Survey(NFHS-3) Volume I. Mumbai: IIPS: 2005-06.

10. Achenbach TM, Rescorla LA. Manual for ASEBA School Age forms and profiles. Research centre for Children, Youth & families, University of Vermont, Burlington, VT, 2001

11. Canals J, Domench E, Carbajo G. Prevalence of DSM III-R and ICD-10 psychiatric disorders in a Spanish population of 18- year olds. Acta Psychiatr Scand. 1997;96:287–294.

12. WHO Global Status Report on Alcohol 2004. Geneva :World Health Organisation. 2004

13. Srinath S, Girimaji CS, Seshadri S, Subbakrishna DK, Bhola P, Kumar N. Epidemiological study of child & adolescent psychiatric disorders in urban & rural areas of Bangalore, India. Indian J Med Res. 2005;122:67–79.

14. Cohen P, Cohen J, Kasen S. An epidemiological study of disorders in late childhood and adolescence- age and gender specific prevalence. J Child Psychol Psychiat. 1993;34(6):851–867.

15. Rubin C, Rubeinstein JL, Stechler G. Depressive affect in normal adolescent: relationship to life stress, family and friends. Am J Orthopsychiat. 1998;68(2):274–284.

16. Ahmad A, Khalique N, Khan Z, Amir A. Prevalence of psychosocial problems among school going male adolescents. Indian J Community Med. 2007;32:219–21.

17. Palossari C, Aro H, Laippala P. Parental divorce and depression in young adulthood: Adolescent&s closeness to parents and self-esteem as mediating factor. Acta Psychiatr Scand. 1996;93:20–26.

18. Chrisi A, Patten MA, Christian G. Depressive symptoms in Californian adolescents- family structure and parental support. J Adolescents Health. 1997;20:271–278.

Effectiveness of Implementation of MEWS with the help of RRS in Reducing in-Hospital Cardiac Arrest and Code Blue in a Selected Hospital Pune City

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Abstract

In-hospital cardiac arrest is preceded by the deterioration of a patient's physiological parameters and vital signs. Identifying and appropriately managing these vital parameters timely can be helpful in reducing in-hospital cardiac arrest and death. Therefore, the initiation of rapid response at the first sign of clinical deterioration has helped the medical team for assessing the risk at early stage and effectively manage their care. The objectives of the study illustrated that to assess the effect of an RRS in reducing the code blues in non-ICU in selected hospitals Pune City, to determine the effects of RRS in reducing the incidence of unexpected deaths, cardiac arrest and CPR. Systematic observation of all the non-critical care patients been included in the study. All the data been collected from the health records. The analysis of the study shows that 92% possible codes prevented after implementation of MEWS & RRS which also increases the total number of elective transferring of patient to the Intensive care unit.

Keywords: MEWS: Modified Early Warning Signs, RRS: Rapid Response System, EWS: Early Warning Signs, RRT: Rapid response team, Code blue, Mortality

Introduction

There has been a growing body of research that focus on recognizing and responding to clinically deteriorating patients in general ward settings in the past decade. In 1999, the Audit Commission reported that the effectiveness of critical care services varied between hospitals and recommended the development of early warning systems (EWSs) to help ward staff identify when to call for specialist advice. The original early warning score (EWS) system was designed to enable early detection of patient abnormalities using major vital signs prior to deterioration into a critical illness. The modified early warning score (MEWS) system, which uses modified physiological parameters for scoring, has proven to be a useful tool for predicting deterioration in patients.[1] Many a times patient deterioration not being monitored on the time of physiological changes of the body and responded to in a timely manner. This inattention in patient care has led to an increase risk and incidences of serious adverse events such as unplanned admission to ICU, in-patient cardiopulmonary arrest and unexpected deaths. Improving timely recognition and prompt

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interventions is therefore, pivotal to the provision of safe and quality care to a deteriorating patient before his condition becomes life-threatening.[2]

The purpose of the MEWS is to facilitate prompt communication between nursing and medical staff when deterioration in a ward patient's condition first becomes apparent on the observations chart. The authors intended this system to result in earlier intervention on the ward so that transfer to a critical care facility is either prevented or occurs without unnecessary delay. In addition, a number of health care organizations have implemented Rapid Response Teams (RRTs) to address situations of acute patient deterioration while under hospital care. Research suggests that after implementing a Rapid Response System, hospitals experience a decrease in the number of cardiac arrests, deaths from cardiac arrest, number of days in ICU post arrest, number of days in the hospital after an arrest, and inpatient deaths.

Background

A robust system of Code Blue was in place to be used in situations where patient needed urgent medical attention. This however seemed more like a corrective action and led the investigators to think about implementing an action that would help the patient in preventing untimely collapse. Patient safety being of paramount importance at Hospital a safety initiative to improve early warning signs detection by nurses was rolled out in 2019.

Observational studies suggest that clinical deterioration of patients on non-ICU is often preceded by changes in physiological observation that are recorded by nursing staffs 6 to 12 hours prior to a serious adverse event ((McGaughey, Alderdice, Fowler, Kapila, Mayhew, & Moutray, 2009).[3]

Tarassenko, Hann, & Young, 2006, says that the failure to respond to patient deterioration promptly and appropriately can lead to increased morbidity and mortality, increased requirements for intensive care, and elevated costs. As a result, strategies for detecting at-risk patients in order to trigger the

timely intervention of a rapid response team have been developed. These approaches are based on the premise that early recognition of physiologic abnormalities coupled with rapid intervention of suitably trained staff may result in an improvement in functional outcome or mortality rate.

Traditionally, the mews scoring is done on all the patients who gets admitted in the non-critical areas in the hospital. It has helped in identifying early deterioration of clinical condition of patients. However, aggregate weighted system such as Rapid response system have been found to be more accurate for detecting early cardiac arrest and elective transferring of patient to the ICU. Clinical audit of the case records revealed that an early heads up on the clinical condition deterioration could possibly prevent a patient from landing into life threatening emergencies.

Objectives of the Study

- To assess the effect of an RRS in reducing the code blues in non-ICU in selected hospitals Pune City.
- To determine the effects of RRS in reducing the incidence of unexpected deaths, cardiac arrest and CPR.
- To study the practice in daily monitoring.

Research Hypothesis: The research hypothesis for this study was: Applying Modified Early Warning Scores prior to Rapid Response system results in earlier detection of patient deterioration and decreased code blue and in-patient mortality.

Research Methodology

Systematic observation of all the non-critical care patients been included in the study.

Inclusion criteria consisted of any adult's patients admitted to the medical and surgical floor during the study period. Exclusion criteria were patients admitted directly to the intensive care unit from the emergency department or operation room and patients younger than 12 years. All the demographic data were collected from the health records.
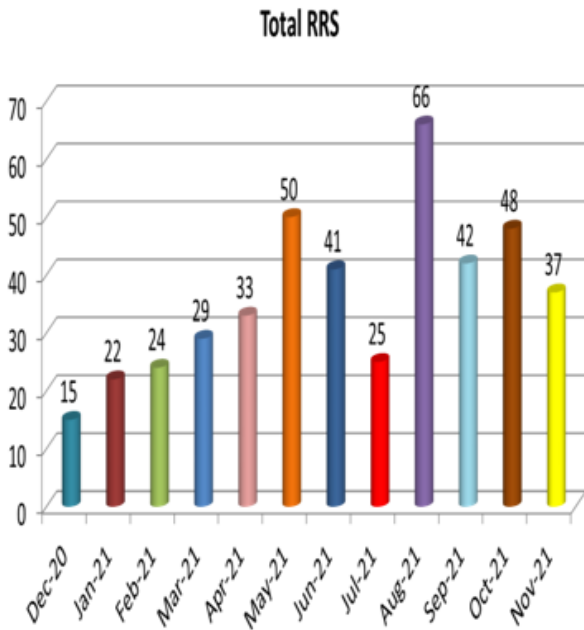
Figure 1: Total RRS data

The above chart shows that maximum escalation of RRS in the month of August (66%), and the minimum escalation done in the initial month of implementation of RRS i.e in December 2020.

Figure 2: Total patient shifted to ICU

The above chart reveals that the total number of elective transferring of patient to the intensive care unit due to the timely escalation of RRS have been increased consistently.

Figure 4: % of possible codes prevented during the study period.

The above line chart shows that the % of possible codes prevented in December 2020 were only 53%, whereas after strengthening the use of MEWS and RRS the % of possible codes prevented up to 94% in the month of October 2021.
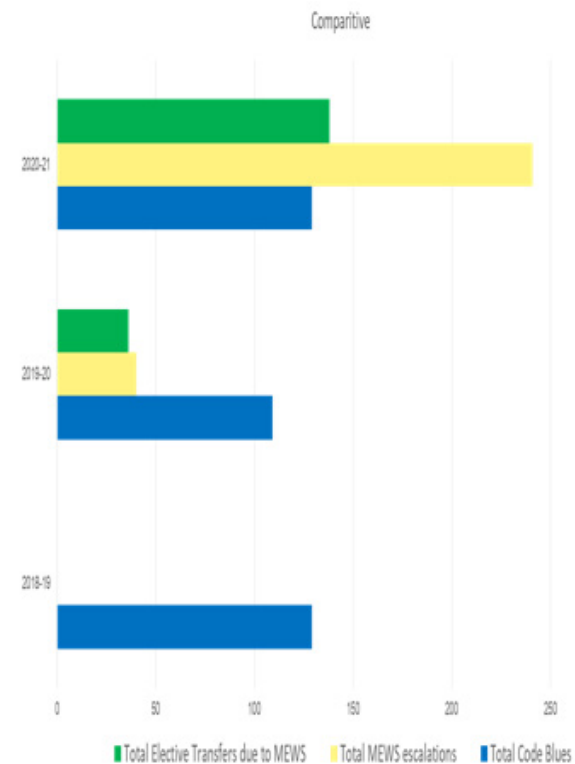
Figure 3: Comparison of code blue before and after the implementation of mews score and total elective transferring due to MEWS.

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Discussion

It is now well known that in-patient cardiac arrests are frequently heralded by changes in physiological parameters. Multiple hospitals including ours, initiated MEWS and RRS. However, various methods to assess the decline in physiological parameters have been used in multiple institutions. MEWS is one of the most studied scoring systems used and has been shown to be useful tool to predict in hospital mortality. Moreover, instead of using single trigger criteria or clinical assumptions made by nurses, clinicians and family members, MEWS systems seems to be more objective and systematic way to recognize patient's deterioration. We started MEWS in 2018 and initiated RRS later as a criterion to escalate criticality of patients to the medical teams. The RRS form been collected by the patient safety officer on the same day.

Analysis for last 12 months shows 92% possible codes prevented after implementation of MEWS & RRS which also increases the total number of elective transferring of patient to the Intensive care unit.

Our study has several limitations. First, this was done in a single organization with 24- hrs. internal medicine resident coverage, which would not be applicable in the general hospitals. Also, our findings could be confounded other un-known variables that could affect in-hospital mortality. Moreover, even though the authors made all the attempts to verify all data corrected, some data were incomplete and respiratory rate is poorly assessed and might not be accurate.

Conclusion

Implementation of MEWS and RRS has provided a systematic way to identify at-risk patients and helps in elective transferring of patients in ICU. MEWS and RRS systems affect mortality and discharge to home/ self-care and hospice. Finally, total in-hospital cardiac arrests reduced although there was no statistically significant difference in code blue.

References

1. Wilkinson R. Critical To success-the place of efficient and effective critical care services within the acute hospital (Audit Commission 1999). Intensive & Critical Care Nursing. 1999;6(15):310-1.

2. Jones DA, DeVita MA, Bellomo R. Rapid-response teams. New England Journal of Medicine. 2011 Jul 14;365(2):139-46.

3. Fairclough E, Cairns E, Hamilton J, Kelly C. Evaluation of a modified early warning system for acute medical admissions and comparison with C-reactive protein/ albumin ratio as a predictor of patient outcome. Clinical medicine. 2009 Feb 2;9(1):30.

4. Mullany DV, Ziegenfuss M, Goleby MA, Ward HE. Improved hospital mortality with a low MET dose: the importance of a modified early warning score and communication tool. Anaesthesia and intensive care. 2016 Nov;44(6):734-41.

5. Ludikhuize J, Borgert M, Binnekade J, Subbe C, Dongelmans D, Goossens A. Standardized measurement of the Modified Early Warning Score results in enhanced implementation of a Rapid Response System: a quasi-experimental study. Resuscitation. 2014 May 1;85(5):676-82.

6. Stewart J, Carman M, Spegman A, Sabol VK. Evaluation of the effect of the modified early warning system on the nurse-led activation of the rapid response system. Journal of nursing care quality. 2014 Jul 1;29(3):223-9.

7. Nishijima I, Oyadomari S, Maedomari S, Toma R, Igei C, Kobata S, Koyama J, Tomori R, Kawamitsu N, Yamamoto Y, Tsuchida M. Use of a modified early warning score system to reduce the rate of in-hospital cardiac arrest. Journal of intensive care. 2016 Dec;4(1):1-6.

Comparing the Psychological Distress Among the Medical Students at Different Levels of Training

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Abstract

Background: Psychological distress is a global health issue which impact the medical students learning and professional development. Varied factors impact the psychological distress of the medical students. The study evaluates the role of year of study on the psychological distress of medical students.

Material and Methods: The study was conducted on 318 medical students in different years of medical training. The items from DASS-21 was validated and used for the data collection. The data was collected by stratified random sampling method. Descriptive and inferential statistical analysis was performed using Statistical package for social science version 26.

Result: Year three students had significantly higher psychological distress compared to all other years of study. The stress and depression is significantly higher in year three students who have progressed from preclinical years to clinical year.

Conclusion: The year three students requires support from the educators to adapt to the more complex learning environment in the clinical years. This would facilitate their leaning and professional development.

Key words: Psychological distress, Stress, Anxiety, Depression, Year of study, Medical students.

Introduction

The psychological distress gains increasing global attention as it has deleterious effect on the ability of the individual to work and the performance. Medical students also suffer from psychological distress during their medical training. This adversely affect their academic performance, competency, empathy, humanitarianism and overall their professional development[1]. Psychological distress is a psychopathological condition of an individual where the symptoms of anxiety, stress and depression are present[2]. Stress, anxiety are the conditions which would affect the professional development of the medical students. Various studies have shown the negative relationship between the stress, anxiety

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and professional identity of the medical students[3-5]. Development of better professional identity is one of the major focus of medical education which has a great impact on the professional practice.

Previous studies documented episodes of depression among the medical students[6,7]. However, not many studies investigated what factors are responsible for persistence, recovery and resilience to depression of medical students. Psychological distress impairs the learning and affect the performance of the medical students during a specific time of the course or throughout the course[8]. There may be a relationship between the year of study and the psychological distress in medical students. The present study validated the adapted DASS-21 and evaluated psychological distress in medical students of different years of study.

Materials and Method

The cross-sectional survey design was used in the current research to assess the psychological distress of the medical students. The population included 318 medical students of 2020 cohort studying in different years in a private medical school where the medical training spread over five academic years. The sample was collected by stratified random sampling technique. The study was approved by the University Ethics Committee (Ethic No: MSU-RMC-02/FR01/01/L1/016)

The questionnaire was developed for measurement of the psychological distress by adapting Depression Anxiety and Stress Scale 21 (DASS-21). The three domains of the scale measures depression, anxiety and stress respectively. The five point Likert scale where score 1-'strongly disagree' and 5-'strongly agree' was adapted to record the responses of the participants. The content validity was ascertained by the content experts. The questionnaire was pilot tested on forty students. The Cronbach's alpha was more than 0.7 indicating good reliability. The respondents were informed about the objective of the study, their right to refuse to answer the questionnaire and the anonymity of the

data collected. The questionnaires were distributed to the randomly selected medical students. The respondents registered their response to the items of the questionnaire after giving informed consent. The data was analysed using the statistical package for social science (SPSS) version 26 and Smart PLS 3.0. The principle component analysis was performed. The reliability, and construct validity (convergent and divergent validity) of the scale was determined. The data was analysed for descriptive and inferential statistics.

Results

The present study included 318 medical students of different gender, ethnicity and year of study. The role of year of study of medical students on psychological distress was studied. The data collected was screened for missing data as well as the outliers. Normal distribution of the data was The data was screened for missing data and outliers. The skewness and kurtosis values of the current research data was much less than the cut-off values stated by Kim, (2013) indicating the normal distribution of the data [9]

Principal component analysis

The principle component analysis (PCA) using varimax rotation with Kaiser normalisation factorisation of the items of the scale was performed. The Kaiser-Mayer -Olkin (KMO) test for sample adequacy determined the suitability of the data for PCA. The KMO value was 0.914 (cut-off point 0.50) indicated the sample adequacy for PCA.

The factor ability of the corelation matrix evaluated by the Bartlett's test for sphericity was significant (χ^2 = 3541.110, df =210, p <0.001). By utilising eigenvalue of 1.0 three factors were extracted (Table 1). These three dimensions of the instrument together explained 58.902% of the total variance. It is well above the minimum threshold value 50% recommended by various researchers[10,11]. The reliability and validity of the factors extracted by PCA further analysed by confirmatory factor analysis.

Table 1: The factor loading reliability and validity measures of the DASS-21 for measurement of psychological distress

Sub-scale Items	DEP	ANX	STR
Depression			
I couldn't seem to experience any positive feeling at all	0.739		
I found it difficult to work up the initiative to do things	0.666		
I felt that I had nothing to look forward to	0.818		
I felt down-hearted and blue	0.730		
I was unable to become enthusiastic about anything	0.810		
I felt I wasn't worth much as a person	0.789		
I felt that life was meaningless	0.770		
Anxiety			
I was aware of dryness of my mouth		0.501	
I experienced breathing difficulty (e.g. excessively rapid breathing, breathlessness in the absence of physical exertion)		0.616	
I experienced trembling (e.g. in the hands)		0.705	
I was worried about situations in which I might panic and make a fool of myself		0.638	
I felt I was close to panic		0.669	
I was aware of the action of my heart in the absence of physical exertion (e.g. sense of heart rate increase, heart missing a beat)		0.786	
I felt scared without any good reason		0.635	
Stress			
I tend to over-react to situations			0.791
I found myself getting agitated			0.811
I felt that I was using a lot of nervous energy			0.672
I found it difficult to relax			0.669
I felt that I was rather touchy			0.710
I was intolerant of anything that kept me from getting on with what I was doing			0.694
I found it hard to wind down			0.620
Reliability and Validity measures	DEP	ANX	STR
Cronbach's Alpha	0.896	0.841	0.883
Overall Cronbach's Alpha	0.916		
Composite Reliability	0.919	0.879	0.908
Variance inflation factor	1.305	1.862	1.699
Average Variance Extracted (AVE)	0.620	0.513	0.587

Confirmatory factor analysis

Confirmatory factor analysis was performed to determine the convergent and divergent validities were examined as a part of construct validity[12,13]. The convergent validity was determined by evaluating the Composite reliability (CR) and average variance explained (AVE). composite reliability of the dimensions of the scale varied from 0.879 to 0.919 well above 0.7 the minimum value recommended [13] (Table 1). The AVE values were well above the cut-off value of 0.5[13] (Table 1). The variance inflation

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factor (VIF) was less than 3.3 indicating absence of collinearity issues (Table 1).

Table 2: Discriminant Validity

Fornell- Larker Criterion			
	Anxiety	**Depression**	**Stress**
Anxiety	0.716*		
Depression	0.471	0.787*	
Stress	0.634	0.383	0.766*
Heterotrait-Monotrait ratio of correlation			
Depression	0.532		
Stress	0.731	0.420	

*square root of AVE

The square root of AVE of each of the factor is more than the correlation coefficient between two different factors[14] (Table 2). The heterotrait-monotrait ratio (HTMT) of correlation which indicated the ratio between the mean value of the correlation between the items across the factors to the mean of the average correlation among the items measuring the same factor. The HTMT was less than 0.85 the cut-off value [15,13] (Table 2). This had shown a good discriminant validity between the factors.

Psychological distress in medical students of different years of study

The present study included participants from year one to year five were 23%, 24%, 21%, 18% and 15% respectively. The overall score of the scale to measure the psychological distress is significantly (p=0.003) different between the years of study.

Table 3: Difference in the Psychological Distress and its Dimensions in medical student of different years of study

Types of motivation		Mean	SD	F	p
Psychological distress	Year 1	2.42	0.64	4.110	0.003
	Year 2	2.26	0.67		
	Year 3	2.69	0.80		
	Year 4	2.28	0.63		
	Year 5	2.42	0.68		
Anxiety	Year 1	2.58	1.00	1.510	0.199
	Year 2	2.42	0.86		
	Year 3	2.71	0.99		
	Year 4	2.36	0.84		
	Year 5	2.50	0.75		
Stress	Year 1	2.82	0.75	2.599	0.036
	Year 2	2.59	0.84		
	Year 3	2.99	1.00		
	Year 4	2.64	0.77		
	Year 5	2.92	1.03		
Depression	Year 1	1.86	0.61	6.582	<0.001
	Year 2	1.79	0.79		
	Year 3	2.37	0.90		
	Year 4	1.83	0.73		
	Year 5	1.83	0.78		

The Bonferroni post hoc test shows the significantly higher psychological distress in year 3 students compared to year 2 (p=0.003) and year 4 (p=0.011). A significant difference in anxiety was not noted between the medical students of different years of study. However, stress and depression scores had shown a significant difference between different years of study. The Bonferroni post hoc test shows the significantly (p<0.05) higher score for year 3 medical students when compared to all other

years which indicates that the psychological distress is highest among the year 3 students when compared to students of all other years of study.

Discussion

In the present study the increase in psychological distress in year three students as they progress from preclinical years (year 1&2) to clinical year (year 3, 4 and 5). A study on physiotherapy students in Malaysia reported that the year 3 students have highest psychological morbidity when compared to the students of all other years[16]. A study on stress among the medical students had shown that the number of students with the stress was highest in year 3 and in subsequent years the number was progressively decreased[17]. There was a notable raise in medical students stress at the end of preclinical years, which declined in later clinical years[8]. Similar findings was reported by Salam et al., (2015). These research findings are similar to the current research findings[18].

As the students' progress from the preclinical years to the clinical years their learning environment becomes more complex. The maladjustment to the new educational environment may be the reason for the distress in students [19]. They need to rotate to new work environment. Each posting and different rotations requires specific skill and medical knowledge. This would constantly highlight their deficiency instead of their progress. In addition, as students enter the clinical years they get separated from their peer support groups. Increased academic demand, lake of time for the recreation, and other issues related to finance, assignments or student abuse etc becomes an additional source of distress.

As the students' progress through the years in clinical years they progressively adapted to the different aspects which might give rise to psychological distress with improved acceptance of their role as member of community of doctors. The encounters with various role models in the learning environment, interactions with the patients and other activities in the community of practice [20] might explain the decrease in the psychological distress of the medical students in year 4 and 5 when compared to year 3 students.

The present study had shown an association between the psychological distress among the medical students of different years of study which would help the educators to develop strategy to support the students at specific period of medical training. This would improve their learning and the professional development.

Conflict of interest: Authors declare no conflict of interest

References

1. Dyrbye LN, Thomas MR, Shanafelt TD. Medical student distress: Causes, consequences, and proposed solutions. Mayo Clin Proc. 2005;80(12):1613–22.

2. Ohayashi H, Yamada S. Psychological distress: symptoms, causes, and coping. Nova Science Publishers; 2012.

3. Sun Y, Wang D, Han Z, Gao J, Zhu S, Zhang H. Disease prevention knowledge, anxiety, and professional identity during covid-19 pandemic in nursing students in zhengzhou, china. J Korean Acad Nurs. 2020;50(4):533–40.

4. Li J, Zheng W, Liu L, Li S. The effect of medical staff's professional identity on psychological stress during public health emergencies : The role of intolerance of uncertainty and adversity appraisal. Acta Psychol (Amst) [Internet]. 2022;227(May):103605. Available from: https://doi.org/10.1016/j.actpsy.2022.103605

5. Zhao Y, Zhou Q, Li J, Luan J, Wang B, Zhao Y, et al. Influence of psychological stress and coping styles in the professional identity of undergraduate nursing students after the outbreak of COVID-19: A cross-sectional study in China. Nurs Open. 2021;8(6):3527–37.

6. Dahlin ME, Runeson B. Burnout and psychiatric morbidity among medical students entering clinical training: A three year prospective questionnaire and interview-based study. BMC Med Educ. 2007;7:1–8.

7. Silva V, Costa P, Pereira I, Faria R, Salgueira AP, Costa MJ, et al. Depression in medical students: Insights from a longitudinal study. BMC Med Educ [Internet]. 2017 [cited 2020 Jul 22];17(1). Available from: https://link.springer.com/article/10.1186/s12909-017-1006-0

8. Moutinho ILD, De Castro Pecci Maddalena N, Roland RK, Lucchetti ALG, TibiriçÁ SHC, Da Silva Ezequiel O, et al. Depression, stress and anxiety in medical students: A cross-sectional comparison between

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students from different semesters. Rev Assoc Med Bras. 2017;63(1):21–8.

9. Kim H-Y. Statistical notes for clinical researchers: assessing normal distribution (2) using skewness and kurtosis. Restor Dent Endod. 2013;38(1):52.

10. Samuels P. Advice on Exploratory Factor Analysis. Cent Acad Success, Birmingham City Univ [Internet]. 2016;(June):2. Available from: http://bcu-test.eprints-hosting.org/6076/

11. Streiner DL. Figuring out factors: The use and misuse of factor analysis. Can J Psychiatry. 1994;39(3):135–40.

12. Churchill GA. A Paradigm for Developing Better Measures of Marketing Constructs. J Mark Res. 1979;16(1):64.

13. Hair JF, Black WC, Babin JB, R.E. A. Multivariate Data Analysis. 8th ed. Annabel Ainscow,Cengage Learning EMEA. 2019.

14. Fornell, C., & Larcker DF. Evaluating structural equation models with unobservable variables and measurement error. J Mark Res This. 1981;18(1):39–50.

15. Henseler J, Ringle CM, Sarstedt M. A new criterion for assessing discriminant validity in variance-based structural equation modeling. J Acad Mark Sci. 2015;43(1):115–35.

16. Selvakumar K, Hui Xian F, A I. A Correlation Analysis on Academic Motivation Developed, and Its Relationship with Gender and Year of Study among Undergraduate Physiotherapy Students in Malaysia. Int J Heal Sci Res. 2022;12(4):44–54.

17. Musiun A, Lukman KA, Jeffree MS, Robinson F, Hassan MR, Ghazi HF, et al. Prevalence of stress and its associated factors among medical students in Sabah, Malaysia Borneo. Malaysian J Public Heal Med. 2019;19(2):116–25.

18. Salam A, Mahadevan R, Rahman AA, Abdullah N, Abd Harith AA, Shan CP. Stress among first and third year medical students at University Kebangsaan Malaysia. Pakistan journal of medical sciences. 2015 Jan;31(1):169.

19. Salam A, Yousuf R, Bakar SMA, Haque M. Stress among medical students in malaysia: A systematic review of literatures. Int Med J. 2013;20(6):649–55.

20. Bassols AM, Okabayashi LS, da Silva AB, Carneiro BB, Feijó F, Guimarães GC, et al. First- and last-year medical students: Is there a difference in the prevalence and intensity of anxiety and depressive symptoms? Rev Bras Psiquiatr. 2014;36(3):233–40.

Perception of Medical Students towards online Teaching During the Covid-19 Pandemic from M.R Medical College, Kalaburgi, Karnataka

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Abstract

Introduction: The nationwide lockdown restrictions to control the spread of Covid-19 disease have impacted all aspects of life wherein medical education has also been affected. Such measures have resulted in a sudden shift in teaching methods towards online teaching. Timely feedback from the students and faculty and analysis of the feedback will improve the effectiveness of online teaching and learning.

Aim: 1. To assess the barriers and benefits that students found during online classes. 2. To assess the challenges faced by the students in transition from traditional to online learning.

Material and Methods: A cross sectional study for 2 months (July 2021 - August 2021) at Mahadevappa Rampure Medical College, Kalaburgi. among 150 Students from the 3rd year MBBS, Data was collected from a Questionnaire in google form format from the students.

Results: 20% of participants found online learning was not effective for medical subjects. 60% found it to be stressful. 76% of students had device of their own and 14% had to share with others.

Conclusion: It is important therefore that medical colleges are aware of the barriers and provide appropriate solutions to the development of this type of learning and support the use of online learning amongst staff and students. Timely feedback from the students and faculty and analysis of the feedback will improve the effectiveness of online teaching and learning.

Keyword: Students, medical, education, feedback, benefits

Introduction

The nationwide lockdown restrictions to control the spread of Covid-19 disease have impacted all aspects of life wherein medical education has also been affected. Lockdown has resulted in a sudden shift in teaching methods towards online medical education. Medical schools had to restructure their curriculum by switching from on-site teaching to online teaching.[3,6]

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Because of the rapid progress of the pandemic, these changes had to be implemented under considerable time pressure.

Although, the current situation might present a unique opportunity for the modernization of medical education in order to fulfill students' teaching needs, opinions still differ on how medical education should be delivered in the future. Thus we have to evaluate the medical student attitudes towards online learning in general, the implementation of online learning in medical schools during the pandemic and change possible teaching scenarios after the pandemic.[2]

Initially it took some time for the Universities to provide guidelines but over the past two years of Covid-19 pandemic lot of improvisation is done and a good framework is provided by the medical education committee across Universities in managing online education for medical students. Teachers are now well trained to conduct online classes with efficiency and the student teacher interaction online has been better with time.

Online education can provide a better alternative in future and help in continuing medical education to the students in any untoward scenarios like pandemic, disasters etc. Also a hybrid module can be introduced in future where the students can access online education from other institutes as well to upgrade their knowledge.

Timely feedback from the students and faculty and analysis of the feedback will improve the effectiveness of online teaching and learning.

Objectives

1. To assess the barriers and benefits that students found during online classes.
2. To assess the challenges faced by the students in transition from traditional to online learning.

Methodology

Study Design - A cross sectional study.

Study Period - 2 months (July 2021 - August 2021)

Place of Study - Mahadevappa Rampure Medical College, Kalaburgi.

Sample Size - 150 Students from the 3rd year MBBS

- 100 responded to the questionnaire

Sampling Procedure - Data was collected from a Questionnaire in google form format from the students.

Inclusion criteria - Third year undergraduate medical students

Exclusion criteria - Who wished not to participate.

Consent - Informed verbal consent was taken prior to the study.

Microsoft Excel Program was used for tabulation of the results.Data was analyzed using IBM SPSS software version 25.

Ethical clearance obtained from Institutional Ethical clearance committee at Mahadevappa Rampure medical college, Kalaburagi, Karnataka.

Results

- 20% of participants found online learning was not effective for medical subjects.
- 60% found it to be stressful.
- 76% of students has device of their own and 14% had to share with others.
- 37% of students found the teachers were extremely helpful during the remote learning.
- 52% enjoyed the online learning format during pandemic.
- 77% students found the college helpful in offering the resources to learn from home?
- 94% found teachers helpful while studying online?

Students were also attending some classes and CME from other platforms as well which helped them to gain knowledge. CME, Webinar and Conferences in online mode had been helpful to both the students and faculty. WhatsApp groups are made to spread the information about these conferences and students are actively attending them to get the latest updates.

This has been another highlight of online medical education.

Table 1. Characteristics of Respondents

Characteristics	Total	Respondents
Age years (mean +/- SD)	150	22 +/- 1.50
Gender n (%)		
Male	86	66
Female	64	34
Academic year n (%)		
Third year MBBS	150	100

ONLINE LEARNING WAS EFFECTIVE FOR MEDICAL SUBJECTS

YES NO

20%

80%
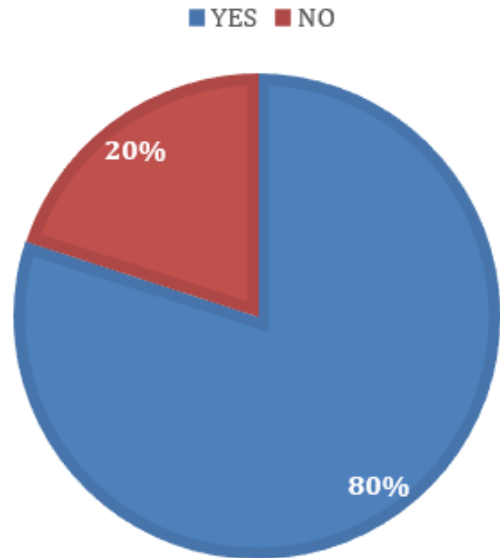
Graph 1. Showing how effective was online learning among medical student respondents.

What device do you use for distance learning?

Count of What device do you use for distance learning?
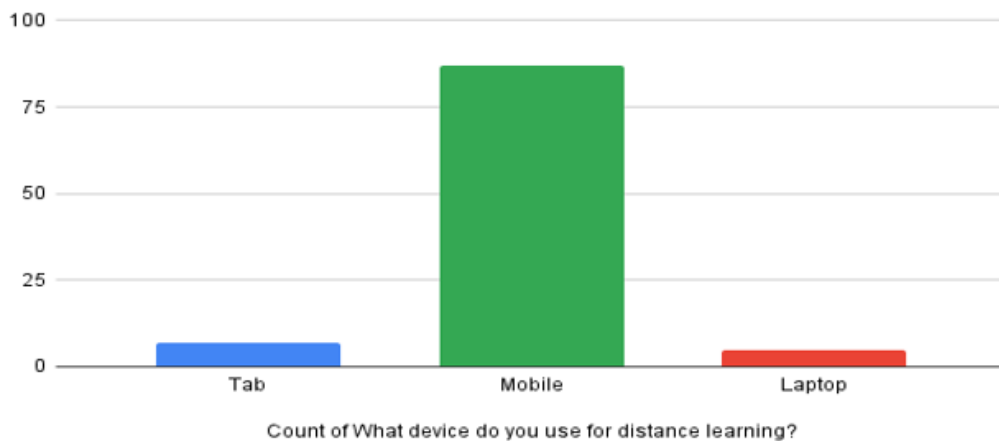
Graph 2. Count of devices used by students.

Table 2. Response to some important Questions

Question	Mean	S.D	Result
How stressful is distance learning for you during the COVID-19 pandemic?	33.33333	23.18045153	Yes
Do you enjoy learning remotely?	25	8.75595	No, there are quite a few challenges
How helpful your [college or University] has been in offering you the resources to learn from home?	20	13.43	Moderately Helpful
How helpful are your teachers while studying online?	20	14.91643	Moderately Helpful

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Table 3. How effective has remote learning been for you? Vs How do you feel overall about distance education?

Chi-Square Tests			
	Value	**Df**	**Asymptotic Significance (2-sided)**
Pearson Chi-Square	167.932[a]	25	.000
Likelihood Ratio	71.826	25	.000
N of Valid Cases	101		
a. 28 cells (77.8%) have expected count less than 5. The minimum expected count is. 01			

Since p-value is 0.000 we reject null hypothesis and accept alternative hypothesis. *(considering 95% confidence interval)*

Conclusion

Online learning in medical education is a relatively new concept and one which is rapidly growing. It is important therefore that medical colleges are aware of the barriers and provide appropriate solutions to the development of this type of learning and support the use of online learning amongst staff and students. In doing so, the teachers and students will be better prepared for the challenges faced in this digital age. A detailed timetable of each session along with the contact number of the faculty, study materials, and timings should be communicated to students in advance, which will help students manage their study time in a more efficient manner. To reduce the number of sessions per day, prerecorded sessions can be shared, which will be beneficial and stress relieving. It is relatively a new experience for the medical field but still somewhere there will be a need for practical classes as the training of a doctor improves with hands on training itself. It can be a temporary solution for certain subjects only in special scenario like pandemic.

Declaration of patient consent -The authors certify that they have obtained all appropriate participant consent forms.

Statement - The manuscript has been read and approved by all the authors, that the requirements for authorship as stated earlier in this document have been met, and that each author believes that the manuscript represents honest work.

References

1. Yilmaz O. E-Learning:Students Input for Using Mobile Devices in Science Instructional Settings. Edu Learn. 2016;5:182. doi:10.5539/jel.v5n3p182.

2. Stoehr F, Müller L, Brady A, Trilla A, Mähringer-Kunz A, Hahn F, et al. (2021) How COVID-19 kick-started online learning in medical education—The DigiMed study. PLoS ONE 16(9): e0257394. https://doi.org/10.1371/journal.pone.0257394

3. Dyrbye L, Cumyn A, Day H, Heflin M. A qualitative study of physicians' experiences with online learning in a masters degree program: benefits, challenges, and proposed solutions. Med Teach. 2009;31(2):e40–e46. doi:10.1080/01421590802366129

4. Finn GM, Brown MEL, Laughey W, Dueñas A. #pandemicpedagogy: Using Twitter for knowledge exchange. Med Educ. 2020; medu.14242. pmid:32418270

5. Huddart D, Hirniak J, Sethi R, Hayer G, Dibblin C, Rao BM, et al. #Med StudentCovid–How social media

is supporting students during COVID-19. Med Educ. 2020; medu.14215. pmid:32392354

6. Moszkowicz D, Duboc H, Dubertret C, Roux D, Bretagnol F. Daily medical education for confined students during COVID-19 pandemic: A simple videoconference solution. Clin Anat. 2020; ca.23601. pmid:32253771

7. Woolliscroft JO. Innovation in Response to the COVID-19 Pandemic Crisis. Acad Med. 2020. pmid:32282372

8. Del Rio C, Malani PN. 2019 Novel Coronavirus—important information for clinicians. JAMA. 2020;323(11):1039. doi:10.1001/jama.2020.1490

9. Hollander JE, Carr BG. Virtually perfect? Telemedicine for Covid-19. N Engl J Med. 2020;382(18):1679–1681. doi:10.1056/NEJMp2003539

10. Taha MH, Abdalla ME, Wadi M, Khalafalla H. Curriculum delivery in Medical Education during an emergency: a guide based on the responses to the COVID-19 pandemic. MedEdPublish. 2020;9(1). doi:10.15694/mep.2020

The Menance of Type 2 Diabetes to Anxiety and Depression Prevalence

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Abstract

Objectives: To estimate the prevalence of anxiety and depression using the Hospital Anxiety and Depression Scale (HADS) in a population aged over sixty years with type 2 diabetes and to study the impact of anxiety and depression on glycemic balance and disease outcome.

Results: The prevalence of anxiety and depression in the 62 subjects included in the study was, respectively, 40.3% and 22.6%. We found a relationship between these disorders and complicated diabetes. The subjects having an imperfectly balanced diabetes had a higher average anxiety score than those having a good glycemic control (9.1 ± 4.2 versus 6.5 ± 3.1; $P = 0.017$). No relationship was found between diabetes balance and depression.

Conclusion: Association between anxiety and depressive disorders and diabetes is frequent and worsens patients' outcome, in terms of diabetes imbalance as well as in terms of diabetic complications. Our study shows that there is need for physicians to detect, confirm, and treat anxiety and depressive disorders in elderly diabetic patients.

Keywords: anxiety, depression, diabetic, scale

Introduction

In India, the proportion of individuals over 60 years is increasing, and it reached 9% in 2004 [1].

Diabetes is a major public health problem. Its prevalence has increased steadily and is currently about 9.9%[2]. Prevalence increases with age (11.9% for 60 years or older)[3,4]. In addition, depression and anxiety, at the top of mental disorders list, mainly remain undiagnosed[5,6], in particular in the elderly[7,8] and consequently untreated[9]. Studying the link between diabetes and depressive as well as anxiety disorders in elderly subjects is useful for several reasons. First, diabetes as well as depression constitutes a major source of functional incapacity, and thus of loss of autonomy, in the elderly population [10]. Second, the association of these two pathologies in the same person worsens total health outcome [11] and quality of life [6, 12]. Finally, this association increases health care expenditures [11] and mortality[13]. The aim of this study is to estimate the prevalence of anxiety and depression in a population of elderly subjects aged over sixty suffering from type 2 diabetes and to study the impact of anxiety and depression on glycemic control and the evolution of the disease.

Material and Methods

We undertook a descriptive and analytical cross-sectional study on 62 patients who have consulted during September and October 2019. Recruitment was carried out on an ad hoc basis.

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The patients included were those who had agreed to take part in the investigation and who were 60 years old or over. We used this age limit because under law, 60 is the retirement age.

Exclusion criteria were the incapacity to answer the questions because of cognitive deterioration and refusal to take part in the study.

We used a semistructured questionnaire composed of sociodemographic and professional characteristics which was administered by the same investigator. We collected the clinical data relating to diabetes (duration, personal medical history: dyslipidemia, cardiac and vascular disorders, obesity, and diabetic complications such as macroangiopathy, nephropathy, peripheral neuropathy, and erectile dysfunction) and therapeutic data (physical exercise, diet, regular followup, treatment compliance). The balance of diabetes was assessed by the last rate of glycated hemoglobin (HbA1) and/or fasting glycaemia. Diabetes was considered as balanced if HbA1 <7% and/or fasting glycaemia ≤6 mmol/L.

To evaluate the mood and anxiety state of subjects, we used the Hospital Anxiety and Depression Scale (HADS), a self-assessment scale that has been developed and found to be a reliable instrument for detecting states of depression and anxiety in the setting of a hospital medical outpatient clinic. The anxiety and depressive subscales are also valid measures of severity of the emotional disorder. It is suggested that the introduction of HADS into general hospital practice would facilitate the large task of detection and management of emotional disorder in patients under investigation and treatment in medical and surgical departments. The thresholds for pathological anxiety and depression were 10 on each of the two subscales (A for anxiety and D for depression) of HADS [14]. We used a validated Arabic version of this questionnaire [15]. The subjects having an elevated score (≥10) were referred to the psychiatric outpatient clinic for specialized evaluation and treatment.

Data analysis was made using the software SPSS for Windows version 11. For the quantitative variables, we calculated averages and standard deviations. We then compared the sub groups: anxious: $A \geq 10$ to nonanxious: $A < 10$ and depressed: $D \geq 10$ to not depressed by chi-square test of Pearson or the Fisher exact test as well as Student's "t" test of. Statistical significance was designated as P less than 0.05.

Results

In our sample, a female predominance was observed. The average age of included subjects was 66.8 years (standard deviation = 4.8) with patients aged 60 years minimum/80 years maximum. More than two-thirds of the subjects were married. The socioeconomic level was qualified as average in more than 40% of the participants. A little less than three quarters of the subjects had no professional qualifications.

The average age of diabetes onset was 54.5 years (standard deviation = 9.4), ranging from 25 to 74 years. The average duration of the diabetes was 12.4 years (standard deviation = 8.1), ranging from 0 to 36 years. The near total of included subjects (90.3%) had a somatic comorbidity associated with the diabetes. Hypertension was the most frequent comorbidity. More than two-thirds of the sample had poor glycemic control. The average fasting glycaemia was 9.4 mmol/L (standard deviation = 4.4 mmol/L) and average HbA1 was 9% (standard deviation = 2.1%). Fifty-seven subjects affirmed having a good compliance with treatment.

The prevalence of anxiety and depression was, respectively, 40.3% and 22.6%. The average score of anxiety was 8.3 ± 4.4. The average score of depression was 6.1 ± 4.3.

According to the HADS scale, women were significantly more anxious than men. The subjects with no professional qualifications scored higher on the anxiety subscale than did subjects with a profession. In our study, we did not find a link between depression and the different sociodemographic variables.

In our study, we did not note a statistically significant correlation between duration of diabetes and anxiety and depression (13.1 ± 7.1 years in anxious subjects versus 11.9 ± 8.7 years in nonanxious subjects; P = 0.59 and 13.7 ± 8.3 years in depressed subjects versus 12 ± 8 years in nondepressed subjects,

P = 0.48). When we studied the link between anxiety/depression and diabetes somatic comorbidities, we found that the average anxiety score of the subjects having a somatic comorbidity was higher, except for subjects having obesity as a comorbidity. However, this correlation was statistically significant only for hypertension. A similar correlation was not found when we studied the relationship between depression and somatic comorbidity. As to glycaemic control, average anxiety score was significantly higher amongst patients whose diabetes was badly managed. Nevertheless, there was no relationship between depression and diabetes balance in our sample. We noted that patients with complicated diabetes had a significantly higher average anxiety score (9.4 ± 3.9 versus 6.3 ± 3.7; P = 0.004). Indeed, anxious subjects had more diabetes complications, especially nephropathy and retinopathy. Subjects suffering from peripheral neuropathy, and retinopathy had a higher depression average score.

Logistic regression analysis showed that anxiety was principally related to female gender (P = 0.008) and to the presence of nephropathy (P = 0.032). On the other hand, depression was correlated with the two variables: peripheral neuropathy (P = 0.004) and retinopathy (P = 0.05)

Discussion

The prevalence of anxiety and depression, according to HADS scores, was, respectively, 40.3% and 22.6% in our sample of elderly diabetic subjects.

In the literature, the prevalence of depression in elderly type 2 diabetics varies from 4.5%[11] to 17%[10]. Contrary to depression, there are few studies[16–18] examining anxiety in type 2 diabetics, particularly in older subjects. A study on a sample of 1,066 elderly type 2 diabetics aged 69 to 74 years[17], showed an average anxiety score of 5.7 ± 3.9 on the HADS scale and an average depression score of 3.9 ± 2.9. The anxiety and depression scores of the patients in our sample were higher. This difference could be explained by our sample being derived from subjects consulting at a hospital. Indeed, diabetic subjects who consulted at the hospital were generally referred there due to difficulties during treatment in first line structures. Consequently, they might have had a

higher risk to present anxiety and depression. That is why it seems to be important to detect and treat these disorders as early as possible.

The relationship between mood disorders and diabetes is bidirectional[10, 13, 19]. Several explanations are proposed that are inevitably interconnected; mood disorders are associated with an unhealthy lifestyle (tobacco abuse, little or no exercise, and excessive caloric intake)[20]. Depression is also related to obesity, which in turn is responsible for intolerance to glucose. Furthermore, depression is associated with physiological abnormalities, including the activation of the hypothalamus-pituitary-adrenal axis, the sympathetic nervous system, and the proinflammatory cytokines[18, 20], which can induce a resistance to insulin, and thus increase the risk of diabetes. Diabetes might increase the risk of depression and anxiety because of feelings of threat and loss related to the announcement of the diagnosis and the need to make lifestyle changes [11]. Finally, the association between mood disorders and diabetes can be partly explained by the existence of comorbidities[3, 18].

In our study, patients having a poorly controlled diabetes presented a significantly higher average anxiety score (P = 0.017). Indeed, these patients might be worried about complications related to their poor glycemic control. In addition, anxiety could deteriorate glycemic balance via adrenergic hyperactivity[21, 22]. We did not find a relationship between depression and diabetes balance; this has also been the case in several other studies on the subject[13, 23, 24].

In our study, subjects having high scores of anxiety and depression had significantly more complications of nephropathy, peripheral neuropathy and retinopathy. Indeed, depressed and anxious subjects are less likely to conform to recommendations concerning their diabetes that could affect glycemic control and consequently might impact the outcome of the disease[11, 13, 16]. Moreover, subjects suffering from diabetes are exposed to continuous stress generated by these complications, which may worsen or precipitate depression [11, 13, 18, 19]. Lastly, depression might constitute an etiopathologic factor responsible for the development of micro and macroangiopathy

via pathophysiological modifications induced by deterioration of cellular immunity (diminished proliferative response of lymphocytes and reduction of NK activity) [11]

Conclusion

Diabetes, anxiety, and depression, are frequent pathologies, and each constitutes a public health problem in Tunisia. These pathologies are known to be more frequent in elderly people. Whereas diabetes is easy to detect and diagnose, this is not always the case with anxiety and mood disorders. According to recent estimates, more than three quarters of these psychiatric pathologies might not be detected. Several factors might explain this: the frequent expression of depression through somatic symptoms in the elderly, the tendency to attribute psychical suffering in the elderly to physical symptoms only the fear of being stigmatized as a psychiatric patient. Our results, in major part, are comparable to those of the literature and confirm the high prevalence of anxiety and depression in elderly subjects suffering from diabetes. The causal link between these two conditions seems to be bidirectional. In any case and according to our results, the association of these two types of pathologies impairs global outcome in terms of a greater diabetes imbalance and more frequent complications. Thus the need to detect, confirm, and treat anxiety and depressive disorders in elderly diabetic subjects. This will only be possible through close collaboration between geriatrists, diabetologists, nutritionists, and psychiatrists.

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Conflict of Interest – Nil

References

1. Ben Ferjani M, Ben Brahim A. Demographic developments in Tunisia and its impact on the labor market and human resources policies. Mediterranean Federation of Human Resources, 2012, http://www.fmrh.org/

2. Evaluation of the Nutritional Status of the Tunisian Population. National Report. Tunisia: Ministry of Public Health; National survey 1996/1997. [Google Scholar]

3. Maraldi C, Volpato S, Penninx BW, et al. Diabetes mellitus, glycemic control, and incident depressive symptoms among 70- to 79-year-old persons: the health, aging, and body composition study. Archives of Internal Medicine. 2007;167(11):1137–1144. [PubMed] [Google Scholar]

4. Dirmaier J, Watzke B, Koch U, et al. Diabetes in primary care: prospective associations between depression, nonadherence and glycemic control. Psychotherapy and Psychosomatics. 2010;79(3):172–178. [PubMed] [Google Scholar]

5. Rigaud AS, Bayle C, Latour F, et al. Psychiatry of the elderly. EMC: Psychiatrie. 2005;2(4):259–281. [Google Scholar]

6. Lloyd C. The impact of diabetes on depression and depression on diabetes. Diabetesvoice. 2008;53(1):23–26. [Google Scholar]

7. Baudic S, Traykov L, Rigaud AS, Césaro P. Place and role of neuropsychological exam in elderly depression. Revue de Medecine Interne. 2005;26(8):637–642. [PubMed] [Google Scholar]

8. Trouillet R, Gély-Nargeot MC. Depression of elderly persons and defence mechanisms in nursing homes. Annales Medico-Psychologiques. 2009;167(2):119–126. [Google Scholar]

9. Guo JY, Han CC, Liu YM. A contemporary treatment approach to both diabetes and depression by cordyceps sinensis, Rich in Vanadium. Evidence-Based Complementary and Alternative Medicine. 2010;7(3):387–389. [PMC free article] [PubMed] [Google Scholar]

10. Pawaskar MD, Anderson RT, Balkrishnan R. Self-reported predictors of depressive symptomatology in an elderly population with type 2 diabetes mellitus: a prospective cohort study. Health and Quality of Life Outcomes. 2007;5(article 50) [PMC free article] [PubMed] [Google Scholar]

11. Bruce DG, Davis WA, Starkstein SE, Davis TME. A prospective study of depression and mortality in patients with type 2 diabetes: the fremantle diabetes study. Diabetologia. 2005;48(12):2532–2539. [PubMed] [Google Scholar]

12. Hardy S, Scanlan M, Gray R. Identifying and managing anxiety and depression in diabetes: a need for training. Journal of Diabetes Nursing. 2010;14(5):190–195. [Google Scholar]

13. Lin EHB, Rutter CM, Katon W, et al. Depression and advanced complications of diabetes: a prospective cohort study. Diabetes Care. 2010;33(2):264–269. [PMC free article] [PubMed] [Google Scholar]

Clinical and Neuropsychological Assessment of Dementia and Geriatric Depression in Patients of Sir T Hospital, Bhavnagar

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Abstract

Three-hundred-and-thirty-four cognitive profiles from neuropsychological examinations assessed during a 2-year period (2020 to 2022) from geriatric patients of a day clinic in the bhavnagar were analyzed. For this purpose, the profiles were divided into the following subgroups:

(1) Mild Cognitive Impairment, no depression (2) Onset or mild dementia, no depression (3) No cognitive deficit, depression (4) cognitively impaired (MCI, dementia) and depression. Subgroups were be compared using analysis of variance (independent variable IV: diagnostic groups, dependent variable DV: cognitive functions) to reveal specific differences that will allow a differential diagnosis. Post-hoc comparisons and a graphical representation of the cognitive profiles were also investigated. All cognitive profiles with a Mini-Mental-State-Examination (MMSE) score of 25 or more points were selected for analysis if they had complete data from the following testing procedures: MMSE, clock drawing test, Geriatric Depression Scale (GDS), Syndrom-Kurztest (SKT), Nuremberg Aging Inventory (NAI) maze test, Wechsler Adult Intelligence Scale (WAIS) similarities, Rivermead Be- havioral Memory Test (RBMT) story immediate and delayed. The results will help to improve the differential diagnostic examination of older depressed people with and without cognitive impairment: Depressed patients usually have no objectifiable memory impairment and inconspicuous scores in the logical structure of thought processes, while attention was usually impaired in both depressed and demented patients.

Keywords: neuropsychology; differential diagnosis; depression; MCI; dementia

Introduction

Cognitive deficits (in mild cognitive impairment/MCI and dementia) and depression are highly relevant issues in older age: Meta-analysis [1] estimates of MCI incidence per 1000 person-years between 22.5 (for ages 75–79 years), and 60.1 (for ages 85+ years), the prevalence for all-cause dementia among individuals aged 50 and older is 697 per 10,000 persons[2]. Depression in old age is also a relevant health problem, with prevalence estimates for major depression in Europe ranging from 9% to 23%[3]. The differential diagnosis of these three disorders is, therefore, a highly relevant topic in the

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treatment of older persons, yet there are hardly any studies comparing neuropsychological profiles.

The Geriatric Day Clinic of Sir T Hospital is a day-care facility with 45 places where multimorbid older patients are treated. The most frequent main or referral diagnoses relate to internal medicine and orthopedics, such as cardiovascular diseases, gait disorders, dizziness, the tendency of falling, musculoskeletal disorders, and chronic pain. During the standard treatment period of three weeks, each patient receives both individual and group therapies by various therapeutic professions.

About one third of the patients have a secondary diagnosis of depression, about half of them show cognitive deficits in the context of MCI (10%) or dementia (40%). In total, far more than half of the patients have a secondary diagnosis in the area of psychological disorders (including dementia, depression, anxiety, somatoform disorder), which is why (neuro-) psychological diagnostics and therapy are of particular importance at the day clinic. Patients with a respective diagnosis are treated both individually and in groups by psychologists working in the day clinic, all of whom have a neuro-/geronto-psychological focus of training and activity.

A very frequent issue is, therefore, the differential diagnosis of MCI/dementia/depression by means of a detailed neuropsychological examination and psychological assessment inter- view. The diagnosis is made in accordance with the ICD-10, which is usually in the medical context, and the current guidelines are always taken into account. According to the S3 guideline Dementia [4], due to the lack of an exact and universally valid definition, MCI is defined as a syndrome consisting of subjective and objectifiable cognitive impairment with preserved activities of daily living. In particular, amnestic MCI with memory impairment as a major symptom is associated with an increased risk of developing dementia.

Methods

Each patient of the clinic was screened at admission with the Mini-Mental-State-Examination (MMSE), clock drawing test and Geriatric Depression Scale (GDS), some of them were presented for a detailed neuropsychological examination according to medical indication because 1. the presence of cognitive deficits was suspected during medical ad- mission or cognitive screening (MMSE and clock drawing test), or 2. the patient complained of subjective cognitive impairments, or 3. cognitive deficits were observed by the staff during their stay. For the purpose of this paper, all these test profiles from the past five years that met the inclusion criteria (verified diagnosis of MCI, onset or mild dementia, and/or a depressive episode) were systematically analyzed. Since in the differential diagnosis of MCI, depression and dementia, the mild manifestations of dementia are of interest, not advanced dementias, all profiles with an MMSE score below 25 points were excluded to exclude patients with more severely impaired cognition and advanced dementia as much as possible.

The diagnosis of cognitive impairment was made after a detailed neuropsychological examination (NPU) and after cerebral imaging (CT or MRI). Newer methods, such as functional Near-Infrared Spectroscopy [5,6] have not yet been implemented as a standard at the clinic. Furthermore, detailed blood analysis was performed as part of the exclusion diagnosis, and the ICD dementia criterion of impairments relevant to daily living was operationalized on the basis of a behavioral observation during the stay in the day clinic. In addition to the screenings MMSE, clock drawing test and GDS performed in the admission assessment, the following test procedures were applied during the neuropsychological examination: SKT, NAI maze test, WAIS similarities, RBMT story immediate and delayed.

The diagnosis of depressive disorder was made on the basis of a clinical interview covering all ICD-10 depression diagnostic criteria.

Based on the verified diagnoses, patients were divided into four groups:

MCI, no depression

dementia, no depression

depression, no cognitive deficit

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cognitively impaired (MCI or dementia) and depression.

Analyses of variance (Independent Variable IV: diagnosis group, Dependent Variable DV: cognitive functioning) were calculated and posthoc comparisons were performed to show differences in neuropsychological profiles.

Results

A total of 334 test profiles were included in the sample, with small differences in the number of patients for the individual test procedures, since not all procedures could be performed as intended for every patient (for example, due to motor limitation, visual or hearing impairment).

The average age of the patients was 81 years (SD 5.2, min 61, max 93 years), 68% of the patients were female. The patients were distributed among the individual diagnostic groups.

Of the 101 patients with depression, 63 patients (62%) were also cognitively impaired (14 patients had a diagnosis of MCI and 49 suffered from dementia); due to the unequal group sizes these were combined into the cognitively impaired (MCI or dementia) and depression group for the calculations.

These four groups were then subjected to a more detailed analysis to identify differ- ences and distinctive features in the neuropsychological test profile. For this purpose, a multivariate analysis of variance (MANOVA) was performed for both the screenings and the detailed neuropsychological examination with the defined diagnostic groups as inde- pendent variables (IV) and the test procedures as dependent variables (DV). In addition, posthoc tests (Bonferroni or Games–Howell) were performed.

Multivariate analysis of variance revealed a highly significant difference between diagnostic groups for screening procedures as dependent variables, $F(9791) = 16.932$, $p < 0.001$, partial eta-square 0.133, Wilk's lambda = 0.651.

The MMSE showed a statistically significant differences between the "dementia" group and the "MCI" group, p = 0.022 (Mdiff = 0.83, 95%-CI [1.58,

0.08]) and between "dementia" and "depression", p = 0.001 (Mdiff = 1.37, 95%-CI [2.33, 0.40]), but not between "dementia" and "cognitively impaired AND depression", p = 1.0 (Mdiff = 0.38, 95%-CI [1.17, 0.40]). There was also no significant difference between "MCI" and "depres- sion", p = 1.0 (Mdiff = 0.54, 95%-CI [1.61, 0.53]), nor between "MCI" and "cognitively impaired AND depression", p = 1. 0 (Mdiff = 0.44, 95%-CI [0.47, 1.36]) nor between "depression" and "cognitively impaired AND depression", p = 0.108 (Mdiff = 0.98, 95%-CI [0.11, 2.08]).

There was no significant difference in the clock drawing test for any group compar- ison: "dementia" and "MCI", p = 0.453 (Mdiff = 0.29, 95%-CI [0.14, 0.71]; "dementia" and "depression", p = 1.0 (Mdiff = 0.25, 95%-CI [0.29, 0.80]); "dementia" and "cognitively impaired AND depression", p = 1.0 (Mdiff = 0.22, 95%-CI [0.67, 0.22]), "MCI" and "depression", p = 1.0 (Mdiff = 0.03, 95%-CI [0.64, 0.57]); "MCI" and "cognitively im- paired AND depression", p = 0.056 (Mdiff = 0.51, 95%-CI [1.02, 0.01]), "depression" and "cognitively impaired AND depression", p = 0.255 (Mdiff = 0.47, 95%-CI [0.14, 1.09]).

In GDS, the group of patients with depression differed significantly from "dementia", $p < 0.001$ (Mdiff = 4.48, 95%-CI [3.1, 5.86]) as well as from "MCI", $p < 0.001$ (Mdiff = 4.76, 95%-CI [3.23, 6.29]), but not from "cognitively impaired AND depression", $p = 0.495$ (Mdiff = 1.03, 95%-CI [−0.54, 2.59]).

Discussion

In clinical diagnostics, it is of particular importance to detect dementia at an early stage and, in particular, to distinguish it from depression, especially since the two conditions are treated in a different way. Misdiagnosis in the sense of undetected dementia, because cognitive deficits are erroneously interpreted as an expression of depression, has the consequence that an early anti-dementia treatment as well as further measures indicated in the case of dementia, such as precautionary measures, etc., may be omitted.

Conversely, an erroneous diagnosis of dementia in the presence of cognitive deficits that occur in the context of depression may also lead to negative consequences in the form of overtreatment

or additional psychological stress for patients and their relatives who are confronted with a dementia diagnosis that may turn out to be incorrect after treatment ofthe depressive symptoms. In this respect, the question is highly relevant whether and, if so, which screening and further psychological testing procedures can differentiate between dementia and depression.

Commonly used screenings, such as MMS and clock drawing tests are insufficient for differential diagnosis of dementia, MCI, and depression, a detailed NPE is absolutely required.

The results show that the MMSE in contrast to the clock drawing test can significantly differentiate between dementia and depression: Patients with dementia have a lower score. This is all the more remarkable as only test profiles with an MMSE score of 25 points or more were included in the sample. With exception of the maze test, the test procedures used in the neuropsychological examination (SKT, RBMT, WAIS) also significantly distinguish between the two diseases. Both attention performance and memory function in the SKT are poorer in dementia patients than in depressive patients, as is memory performance for complex content (RBMT) and logical structure of thought processes and the general capacity for abstraction (WAIS).The distinction between MCI and depression is even more challenging, as the cognitive impairment in MCI is often less pronounced than in dementia. The diagnosis of MCI is usually accompanied by the recommendation of annual follow-up examinations, as the risk of developing dementia is increased, but drug therapy is not indicated according to official guidelines. The screening methods MMSE and clock drawing test do not differentiate MCI from depression; in the NPE, the SKT total score (but only due to the memory subscore) and the RBMT proved to be suitable to significantly differentiate MCI from depression. Patients with MCI showed poorer memory performance, but no relevant differences to depressive patients were found with regard to attention performance.

Irrespective of the presence of depression, the differentiation of MCI from onset dementia is also an important aspect since the possibility of anti-dementia treatment is only given with a manifest dementia diagnosis, whereas MCI requires regular progress monitoring in order to detect conversion to dementia (up to 10% annually). Here, all test procedures from the NPE, as well as the MMSE, proved to be suitable to significantly differentiate between both diagnostic groups.

Conclusion

Each neuropsychological examination should yield the same result even if different procedures are used, it is up to the respective examiner to select tests that are not only suitable for the particular question, but also take into account the context (in-or outpatients, study, etc.) and specific features of the subject (age, motor or sensory limitations, etc.).

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References

1. Gillis, C.; Mirzaei, F.; Potashman, M.; Ikram, M.A.; Maserejian, N. The incidence of mild cognitive impairment: A systematic review and data synthesis. Alzheimer's Dement. 2019, 11, 248–256.

2. Cao, Q.; Tan, C.C.; Xu, W.; Hu, H.; Cao, X.P.; Dong, Q.; Tan, L.; Yu, J.T. The Prevalence of Dementia: A Systematic Review and Meta-Analysis. J. Alzheimers Dis. 2020, 73, 1157–1166. [CrossRef] [PubMed]

3. Andreas, S.; Schulz, H.; Volkert, J.; Dehoust, M.; Sehner, S.; Suling, A.; Ausín, B.; Canuto, A.; Crawford, M.; Da Ronch, C.; et al. Prevalence of mental disorders in elderly people: The European MentDis_ICF65+ study. Br. J. Psychiatry 2017, 210, 125–131. [CrossRef] [PubMed]

4. Deuschl, G.; Maier, W. S3-Leitlinie "Demenzen". Dtsch. Ges. Neurol. Hrsg. Leitlin. Diagn. Ther. Neurol. 2016. [CrossRef]

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5. Nakamura, S.; Yomota, S.; Ito, H.; Akinaga, N.; Hori, A.; Chinomi, K.; Suzuki, H.; Uchida, K.; Asada, T. A Novel Cognitive Function Scale Using Functional Near-Infrared Spectroscopy for Evaluating Cognitive Dysfunction. J. Alzheimers Dis. 2021, 81, 1579–1588. [CrossRef] [PubMed]

6. Husain, S.F.; Yu, R.; Tang, T.B.; Tam, W.W.; Tran, B.; Quek, T.T.; Hwang, S.H.; Chang, C.W.; Ho, C.S.; Ho, R.C. Validating a functional near-infrared spectroscopy diagnostic paradigm for Major Depressive Disorder. Sci Rep. 2020, 10, 9740. [CrossRef] [PubMed]

7. Folstein, M.F.; Folstein, S.E.; McHugh, P.R. A practical method for grading the cognitive state of patients fort he clinician. J. Psychiatr. Res. 1975, 12, 189–198. [CrossRef]

8. Lezak, M.D.; Howieson, D.B.; Loring, D.W.; Hannay, H.J.; Fischer, J.S. Neuropsychological Assessment, 4th ed.; Oxford University Press: New York, NY, USA, 2004.

9. Shulman, K.; Gold, D.; Cohen, C.; Zuchhero, C. Clock-drawing and dementia in the community: A longitudinal study. Int. J. Geriatr. Psychiatry 1993, 8, 487–496. [CrossRef]

10. Lee, H.; Swanwick, G.; Coen, R.; Lawlor, B. Use of the clock drawing test in the diagnosis of mild and very mild Alzhiemer's disease. Int. Pschogeriatr. 1996, 8, 405–415.

11. Yesavage, J.A.; Brink, T.L.; Rose, T.L.; Lum, O.; Huang, V.; Adey, M.; Leirer, V.O. Development and validation of a geriatric depression screening scale: A preliminary report. J. Psychiatr. Res. 1982, 17, 37–49. [CrossRef]

12. Yesavage, J.A.; Sheikh, J.I. Geriatric Depression Scale (GDS): Recent evidence and development of a shorter version. Clin. Gerontol. 1986, 5, 165–173. [CrossRef]

13. Erzigkeit, H. SKT: Kurztest zur Erfassung von Gedächtnis- und Aufmerksamkeitsstörungen. Manual; Test GmbH: Weinheim, Germany, 1989.

14. Stemmler, M.; Lehfeld, H.; Horn, R. SKT nach Erzigkeit; SKT Manual Edition 2015; Geromed GmbH: Spardorf, Germany, 2015.

15. Oswald, W.D.; Fleischmann, U.M. Nürnberger Alters-Inventar (NAI); NAI test manual and text volume; Hogrefe: Göttingen, Germany, 1997.

Psychoeducation in Family with Clients Recovering from the Risk of Violent Behavior

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Abstract

Recovery is a change in which a person improves his health and well-being, lives in the direction of life he chooses, and strives to achieve life goals according to all his abilities. Recovery conditions are very necessary for every client with mental disorders (ODGJ), where strengthening hope, especially from within ODGJ itself, activates them to be active independently with family, friends, and the community in their environment. ODGJ with Violent Behavior has anger that is expressed excessively and is not controlled verbally to the point of injuring others and or not harming the environment. Through this research with a pre-test-posttest control group design. The results found in this study, it was found that the average recovery rate of ODGJ in the intervention group was 116.17 and the average recovery rate of ODGJ in the control group was 94.03 so it can be concluded that the average recovery rate of the intervention group was 22.14 greater than the control group with a significance of P-Value < 0.05. The results showed that there was a significant difference in the recovery rate of ODGJ in the intervention group and the control group. There was also an increase in the recovery rate in the control group, this was possible because of other interventions to increase the recovery of ODGJ with the risk of violent behavior either in the form of individual, family, or community interventions. Thus, to take sides with all elements in the ODGJ environment, encourage a sustainable family psychoeducation program policy, and be accompanied by monitoring of family capabilities, especially effective communication within the family in the form of regular family visits by utilizing a tiered health facility system.

Keywords: Family, Psychoeducation, The Recovery, Clients with Mental Disorders (ODGJ), The Risk of Violent Behavior

Introduction

Violent behavior is a form of behavior that aims to injure someone physically or psychologically. The risk of violent behavior is the behavior displayed by the individual. Threats can be physical, emotional, or sexually directed at another person.[1] Conditions of risk of violent behavior have a hierarchy from low: showing low hostility, being loud and demanding, threatening, injuring at a mild level to a high risk of injuring at a serious level and requiring medical treatment.[2] Incidence of violent behavior in the United States, the number of ODGJ with schizophrenia reaches 2.5 million people, while in Indonesia based on basic health research data in 2013 there are 400,000 people. One of the causes, among others, is the lack of knowledge and understanding of families and communities about mental disorders or problems,

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the lack of the number and quality of professional medical personnel, and the lack of treatment facilities. Mental health nurses play a key role in all aspects of the care and treatment phase of schizophrenia. However, the number of Mental Specialist Nurses in Indonesia in 2016 was 160 people and was added by nurses in Mental Hospitals which were also limited in number[3]. Therefore, psychoeducational skills need to be encouraged in the family environment, especially assertive abilities to create a sense of security and comfort for ODGJs in everyday life.

Methods

This research is experimental with a quasi-experimental design, with a pretest-posttest control group design with 36 samples treated as outpatients at the SH Jakarta Hospital. The ability of nurses who intervened with their families had previously been made to equalize perceptions through training on psychoeducation, especially communication. The research was conducted for a year with ethical clearance taken from the ethics committee of the Ministry of Health Indonesia (KEPPKN) with CIOMS 2017, Health polytechnic Jakarta I in February 2018.

Result and Discussion

As a result, recovery is characterized by symptom remission, involvement in work or school, independent living without close supervision by the caregiver, no dependence on financial support, and having friends with routine activities for at least two consecutive years. In the variable of recovery rate, based on table 5.5, the average value of the pre-test recovery rate for the intervention group was 52.69 and the post-test was 116.17, increasing to 63.48. The results of the analysis showed that there was a significant increase in the client's recovery rate before and after the intervention in the intervention group with a value of $p = 0.0001$ (p <0.05). Similarly, in the control group, the average pre-test score for the control group was 44.56 and the post-test was 94.0 so there was an increase of 49.47, but the difference in the increase was lower than the intervention group. The results of the analysis showed that there was a significant increase in the recovery rate of ODGJ in the control group (p<0.05).

The recovery rate before and after the psychoeducation group action was the most in the control group with no increase in the recovery rate among as many as 33 respondents (91.7%).

In the study, it is known that the average recovery rate of ODGJ in the intervention group is 116.17 and the average recovery rate of ODGJ in the control group is 94.03 so it can be concluded that the average recovery rate of the intervention group is 22.14 greater than the control group with a significance $p = 0.0001$ (p < 0.05). The results showed that there were significant differences in the recovery rate of ODGJ in the intervention group and the control group. There was also an increase in the recovery rate in the control group, this was possible because of other interventions to increase the recovery of ODGJ with the risk of violent behavior in the form of individual, family, or community interventions.

The grounded theory of stress diathesis model of severe psychiatric disorders, states that family intervention programs include components that indicate the presence of bi-biological susceptibility and increased sensitivity to stress that decreases in the family[4]. To minimize biological susceptibility, the program supports medication adherence and employs didactic and problem-solving strategies. To reduce stress levels, this program includes an educational component that ensures that all family members have realistic expectations, good communication, and problem-solving thereby reducing conflict in the family and family adjustment to ODGJ at risk of violent behavior.

Even normal families without ODGJ will often experience conflict within the family if they do not have good communication. Lack of communication skills will cause the message to not arrive correctly in the family, so that differences in perceptions and views between family members are not conveyed correctly and trigger conflicts in the family.

The presence of ODGJ in the family coupled with the risk of violent behavior experienced will increase the burden on the family. If it is not conveyed properly, it will add to the conflict in the family. Family communication skills will have a good impact in recognizing problems in the family, problems with ODGJ, and getting a good solution that can be accepted and implemented by the family with agreed norms and rules.

Conclusion

As the smallest unit of society consisting of the head of the family and several people who gather and live in one place under one roof in a state of interdependence, the family can improve communication skills from families to ODGJ by showing an increase in the average recovery of ODGJ, this condition strengthens that the family will be able to facilitate independent recovery if Psychoeducation, especially communication is carried out properly and continuously in their daily lives. Thus, the quality of family support has a very important meaning in family relationships, members who receive support from family have good relationship quality. The quality of family support is divided into three, namely: Closeness, Reciprocity, and Durability. Family and friends can help reduce the level of anxiety caused by the condition of ODGJ, they can eliminate the temptation to disobedience, and family can often be a support group to achieve compliance so that ODGJ can be productive according to their developmental tasks and functions.

There is no Conflict of Interest.

References

1. Keliat et al. Community Mental Health Nursing/ CMHN (Basic Course). EGC. 2015.

2. Herrero J, Gracia E. A brief measure of depressive symptomatology (CESD-7). Salud Ment. 2007; 30 (5).

3. Wijayanti AP, Masykur AM. Release To Be Back Confined: A Case Study of Re-Shackling Of Former Mentally Ill Patients. Empathy. 2016; 5(4):786–98.

4. Putri AW, Wibhawa B, Gutama AS. Mental Health of the Indonesian People (Knowledge, and Public Openness to Mental Health Disorders). 2015; 2(2):252–8.

5. Murthy, S. (2003). *Family Interventions and Empowerment as an Approach to Enhance Mental Health Resources in Developing Countries.* www.pubmedcentral.nih.gov. 14 February 2010.Putri AW, Wibhawa B, Gutama AS. Mental Health of the Indonesian People (Knowledge, and Public Openness to Mental Health Disorders). 2015; 2 (2):252–8.

6. The Substance Abuse and Mental Health Services Administration (SAMHSA). *Behavioral Health Treatment Services Locator.* https://www.samhsa.gov/find-help/ disaster-distress-   helpline/disaster-types/incidents-mass-violence. 2017.

7. Vieira, E.T. Family Communication Patterns, Sympathy, Perspective Taking, and Girls' Thought About Interpersonal Violence. *Journal of Family Violence.* 2015; 30, 607- 619. 1.

Heart Failure with Preserved Ejection Fraction: An Enigma

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Abstract

Heart failure with preserved ejection fraction(HFpEF) is an entity showing an upward trend. The affected population is rising on account of rise in the geriatric population as well as expanding incidence of comorbidities,thus underlining the necessity of greater therapeutic avenues. The underlying disease mechanisms are complicated. Irrespective of EF, HFpEF negatively influences quality of life and hard clinical endpoints. Greater research into HFpEF phenotypes, criteria for definition and improvement in prognosis is the need of the hour.

Keywords: HfpEF, diastolic function, sacubitril-valsartan

Introduction

Heart failure with preserved ejection fraction (HFpEF) is a problem of considerable magnitude worldwide. HFpEF is described as a condition in which the heart is incapable of pumping blood without increase in filling pressure. Initially called diastolic heart failure and then,heart failure with normal ejection fraction. The 2021 European Society of Cardiology (ESC) guidelines categorises heart failure (HF) into three types on the basis of ejection fraction: heart failure with preserved ejection fraction (HFpEF, LVEF ≥ 50%), heart failure with reduced ejection fraction (HFrEF, LVEF ≤ 40%), and heart failure with mildly reduced ejection fraction (HFmrEF, LVEF 41–49%).[1]

Notwithstanding all developments in identification and management of heart diseases, the patient population of this illness is projected to rise in future on account of improvement in lifespan and increase in diabetes and hypertension. Presently,out of all heart failure cases needing inhospital treatment, HFpEF contributes 50%. Considered to be milder than HFrEF in the beginning, the variable clinical profile and causation of HFpEF impedes the diagnosis. It is more commonly observed in females, advanced age and patients with other illnesses like diabetes, hypertension, nephropathy, lung disease and increased body weight. All these ailments are becoming increasingly common and hence,the burden of disease is expected to rise in future. Moreover, Covid has been seen to be associated with increasing occurrence and severity of HFpEF. In addition, certain conditions like hereditary cardiomyopathy, Fabry's disease, amyloidosis and constrictive pericarditis may manifest as HFpEF.[2] The financial implications of the illnesss are immense considering that more than half of all HF admissions are due to HFpEF. Yet,

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management is suboptimal due to lack of effective drugs and predominantly elderly patient population.

It is observed that the mechanistics of HFpEF are not limited to diastolic function impairment and the crux of the illness is a rise of left ventricle (LV) diastolic pressure for which multiple pathways are responsible. Reduced myocardial compliance is due to alteration of contents of interstitial tissue and changes in calcium signalling of sarcomeres. In addition, changes in titin lead to altered expression of isoforms. Inflammation and impaired endothelial function are contributory as evidenced by clustering of multiple illnesses in the same patient. The current understanding of the genesis of HFpEF is nebulous and hence, therapeutic agents are hard to evolve.

Transthoracic echocardiography is the mainstay of diagnosis of HFpEF as LVEF>50% is the sole defining criterion. The disadvantage however is that EF is derived from volume measurement from a planar view. According to American Society of Echocardiography and European Association of Cardiovascular Imaging(ASE/EACVI) guidelines, the mitral E/A ratio determines the grade of diastolic dysfunction. If E/A>2,LV filling pressure is raised whereas if it is between 0.8 and 1.9, raised LA volume index, TR velocity>2.8 m/s and E/e' >14 is indicative of raised LA pressure.[3]

Multiple therapeutic agents have been tried in HFpEF with the majority of the trials providing discouraging results. One possible reason is the overreliance on EF as the sole criterion for definition. The disease entity appears to be a poorly demarcated motley group of many different patient populations where a single drug may not be effective. Hence, it is still contentious if LVEF should be the only parameter to identify HFpEF. The combination of sacubitril-valsartan has been found superior to valsartan if inititated as soon as possible in an acute setting.[4] Moreover, in an HF cohort, drug efficacy has been shown to fall with rising EF. Multiple substudies of the PARAGON trial demonstrate beneficial effect in contrast to the negative results of the entire trial. Usage of the drug in the initial period of hospitalisation and female gender favored drug efficacy while higher EF attenuates it.[5] Hence, apart from EF, patient characteristics should be taken into account for therapeutic decision making.

The routine administration of beta blockers is another example of the same phenomenon. HFpEF patients have been studied in SENIORS and J-DHF for the role of beta blockers.[6] While favorable result was observed in EF>35% group,subsequent study with 50% as threshold did not show benfit. Admittedly, these trials were not exclusively conducted on a HFpEF population and hence, the results should not be considered binding. From these issues arose the need for labelling those with EF between 40-50% as heart failure with mid-range EF(HFmrEF) whose features leans more towards HFpEF.Constituting about 15% of HF patients, the features and hence,management lean towards HFpEF.

Sacubitril-valsartan has earned a class IIa recommendation in treatment of HFpEF. PARAGON showed considerable benefit (although not statistically significant), especially when EF<57%, thus furthering the argument for changing the threshold value for HFpEF. A substantial improvement in NYHA class and kidney parameters was noted. The drug was associated with greater frequency of hypotension and angioedema but lesser renal impairment and hyperkalaemia.In a study comparing ARNI versus ACEI/ARB over 12 weeks, NT-proBNP was significantly decreased with fall in HF hospitalisation and nephropathy but functional capacity as assessed by 6-minute walk test did not improve.[7] Quality of life assessment,based on KCCQ score also remained unchanged after 24 weeks. Multiple trials are underway to clarify the management of HFpEF. In the PRISTINE-HF trial, multiple clinical endpoints are being evaluated in a cohort of 60 patients. NT-proBNP assessment between two groups(sacubitril-valsartan vs valsartan) is being studied in PARAGLIDE-HF trial.[8] The cognitive state of HFpEF patients on sacubitril-valsartan vs valsartan is the subject of analysis in the PERSPECTIVE trial. The ARNIMEMS trial is currently studying the effect of sacubitril-valsartan in HFpEF and pulmonary hypertension on multiple parameters.[9]

The foundation was however laid by by the phase II PARAMOUNT trial that demonstrated fall in NT-proBNP, decrease in LA size and NYHA class betterment by sacubitril-valsartan vis-à-vis

valsartan. ENHANCEMENT-HIV is assessing the efficacy of the same drug in HIV-related HFpEF. In short, the objective is to observe the effect of the drug on parameters pertaining to inflammation in HIV through left atrial volume index and myocardial fibrosis.

ACE inhibitors

Available information implicates angiotensin II in causation of poor effort tolerance in HFpEF and hence, a possible therapeutic avenue. PEP-CHF, the first trial using ACE inhibitors used perindropril in old age patients with a EF range 40-50%. The result was negative for a combination of mortality and hospital admission on account of nominal number of events and a number of trial partticipants discontinuing prescribed therapy after 1 year. Fall in hospital admission for HF and in primary endpoint reached significance at the end of 1 year. In contrast, there was no significant effect on death and suffering. Enalapril was tried in diastolic dysfunction but over 1 year, revealed no amelioration in effort tolerance, compliance of aorta or LV parameters.

SGLT2 inhibitors

The Empagliflozin in HF with a Preserved Ejection Fraction (EMPEROR-Preserved) study from 2021 investigated the efficacy of an SGLT2 inhibitor in patients with HF and preserved ejection fraction. The EMPEROR-Preserved study investigated the combined occurrence of cardiovascular death or hospitalisation for HF (HHF) as a primary outcome, occurrence of all hospitalisations for HF as a first secondary outcome and the rate of decline in eGFR as a second secondary outcome.[10] Additionally, subgroup analysis of patients according to EF was performed. The EMPEROR-Preserved study found that treatment with empagliflozin reduced the occurrence of HHF and cardiovascular death as a combined primary outcome. Specifically, SGLT2 inhibition led to a 21% lower relative risk of the primary outcome in the cohort of patients treated with empagliflozin. The study found a reduced number of hospitalisations from 11.8% in the placebo group to 8.6% in patients being treated with empagliflozin [21]. However, it did not show any statistical difference in cardiovascular death (or death fother causes) between patients taking empagliflozin and

the placebo[21]. Whereas several studies investigating sacubitril/valsartan, spironolactone and candesartan in HFpEF have been unable to provide undisputable proof for their effectiveness in patients with an EF of 50% or more[15–17, 22, 23], subgroup analysis of the EMPEROR-Preserved patient cohort showed that empagliflozin reduced the number of primary outcome events (cardiovascular death or HHF) in patients with an EF ranging between 50% and 60% and more than 60%, when compared with placebo. Furthermore, the EMPEROR-Preserved study also investigated the protective effect of empagliflozin on the kidneys. The study demonstrated that patients receiving empagliflozin had a slower decline in estimated glomerular filtration rate (eGFR) when compared with patients receiving placebo: a decline in eGFR of 1.25 mL per year in patients receiving empagliflozin compared with a decline in eGFR of 2.62 mL in patients receiving placebo[21]. The results from the EMPEROR-Preserved study suggest that empagliflozin is beneficial for patients with HFpEF. This study is the first randomised controlled trial (RCT) to demonstrate a mortality benefit and significant morbidity benefit in patients with HFpEF, who have previously been limited to treatments for symptom control and risk factor management.

Conclusion

Heart failure with preserved ejection fraction (HFpEF) is a heterogeneous syndrome and a diagnosis based solely on LVEF may be insufficient. The diagnostic process should ideally use the recently introduced H2FPEF and HFA-PEFF algorithms. HFpEF therapy must include the adequate treatment of comorbidities and risk factors, as they influence prognosis. Avoiding fluid overload by diuretic treatment to increase quality of life is an essential part of HFpEF therapy. If available, telemonitoring should be incorporated into HFpEF management to detect fluid overload before signs and symptoms of congestion. LCZ696 has been granted an expanded indication for patients with LVEF < 50% by the FDA. Empagliflozin is the first drug to significantly reduce morbidity and mortality in HFpEF patients and should be the cornerstone of any HFpEF treatment. Further research is needed to enhance our understanding of the complex syndrome of HFpEF and help improve HFpEF management.

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References

1. McHugh K, DeVore AD, Wu J, et al. Heart failure with preserved ejection fraction and diabetes: JACC State-of-the-Art review. J Am Coll Cardiol 2019;73:602–11.

2. Youn JC, Ahn Y, Jung HO. Pathophysiology of heart failure with preserved ejection fraction. Heart Fail Clin 2021;17:327–35.

3. Hong GR, Vannan MA, Bossone E. Heart failure with preserved ejection fraction: current opinion and future perspectives. Heart Fail Clin 2021;17:xiii–v.

4. Xanthopoulos A, Triposkiadis F, Starling RC. Heart failure with preserved ejection fraction: classification based upon phenotype is essential for diagnosis and treatment. Trends Cardiovasc Med 2018;28:392–400.

5. Uijl A, Savarese G, Vaartjes I, et al. Identification of distinct phenotypic clusters in heart failure with preserved ejection fraction. Eur J Heart Fail 2021;23:973–82.

6. Kato M, Yamamoto K. Sleep disorder and heart failure with preserved ejection fraction. Heart Fail Clin 2021;17:369–76.

7. Lee CJ, Park S. Hypertension and heart failure with preserved ejection fraction. Heart Fail Clin 2021;17:337–43.

8. Rossi AP, Nguyen NTV, Tran DT, et. al. Clinical phenotypes and agerelated differences in presentation, treatment, and outcome of heart failure with preserved ejection fraction: a Vietnamese multicenter research. Cardiol Res Pract 2021;2021:4587678.

9. Toth PP, Gauthier D. Heart failure with preserved ejection fraction: strategies for disease management and emerging therapeutic approaches.Postgrad Med 2021;133:125–39.

10. Ananthram MG, Gottlieb SS. Renal dysfunction and heart failure with preserved ejection fraction. Heart Fail Clin 2021;17:357–67.

Retrospective Analysis of Mortality in a Tertiary Care Teaching Hospital in South India

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Abstract

Introduction: Mortality data reveals much about the health of the population. Traditionally and universally, most epidemiological studies begin with mortality data. Mortality characteristics and the audit give a myriad of information. This helps to identify trends of mortality. Mortality audit of mortality data is essential to improve hospital services and helps in proper allocation of resources. Hence this study was conducted to identify the mortality characteristics of the patients admitted in the year 2021 in the Tertiary care hospital in South India.

Material and Methods: This retrospective study was conducted after Institutional ethical clearance with mortality records pertaining to the patients admitted to Hangal Sri Kumareshwar Hospital and Medical Research Center, Bagalkot, Karnataka during the year 2021. The data retrieved included demographic characteristics like age and sex, place of residence, ward of admission and causes of death classified according to ICD 10th revision and analysed using percentages and chi-square test and a p value of less than 0.05 was considered as significant in all the tests.

Results: Out of 592 deaths in 2021, 64.19% were males and 35.81% were females. Majority of the deaths (34.46%) occurred between the ages of 41 to 60 years followed by 61 to 80 years (27.20%). Communicable diseases contributed to 54.56% of the total deaths (p= 0.0022).

Conclusion: Statistical analysis of causes of death from mortality statistics is the backbone of National health policy and planning of health programs. It monitors the trend in public health issues like infant mortality, maternal mortality, infectious diseases, accidents and suicides.

Key words: Mortality, Tertiary care hospital, Communicable diseases, Non communicable diseases

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Introduction

Mortality data reveals much about the health of the population. Traditionally and universally, most epidemiological studies begin with mortality data.[1] Public health planning should be based on reliable and timely data on the leading causes of death. Cause of death statistics from hospitals are routinely amalgamated along with mortality statistics from other sources to constitute essential statistics on the health of a population. Such data are widely used by Governments, researchers, donors and global development agencies. They are used to periodically review health priorities, set research agendas and monitor progress towards national and global health and development goals.[2] The magnitude of mortality and causes are different from ward to ward even in one hospital. The magnitude of mortality in the health care setup is more affected by state of hospitalization, length of stay, number of co morbid conditions and type of illness. Majority of the causes are known to be preventable /avoidable by applying preventable strategies like guidelines and being compliant with it.[3] Mortality is an inevitable component of hospital practice and patient outcomes. Mortality characteristics and the audit give a myriad of information. This helps to identify trends of mortality. Mortality audit of mortality data is essential to improve hospital services and helps in proper allocation of resources.[4] Hence this study was conducted to identify the mortality characteristics of the patients admitted in the year 2021 in the tertiary care hospital in South India.

Material and Methods

This retrospective study was conducted after Institutional ethical clearance with mortality records pertaining to the patients admitted to Hangal Sri Kumareshwar hospital and medical research center, Bagalkot, Karnataka during the year 2021. The data retrieved included demographic characteristics like age and sex, place of residence, ward of admission and causes of death classified according to ICD 10th revision and analysed using percentages and chi-square test and a p value of less than 0.05 was considered as significant in all the tests.

Results

Out of 592 deaths in 2021, 64.19% were males and 35.81% were females. It was observed that 68.41% of the deaths were in those from rural areas. (Table 1) Majority of the deaths (34.46%) occurred between the age of 41 to 60 years followed by 61 to 80 years (27.20%) and was found to be statistically significant (Table 2). Majority of the deaths (29.73%) occurred in Covid 19 ward and was found significant (p= <0.01) (Table 3) Communicable diseases contributed to 54.56% of the total deaths (p= 0.0022) (Table 4) Regarding Covid 19 deaths, majority (29.55%) were between 51 to 60 years of age (Table 5) Maximum number of Covid 19 deaths (58.11%) occurred in those who were residing in rural areas (p =0.736). Majority of the deaths (31.42%) occurred in the month of May 2021 (p=0.034)

Table 1: Distribution according to area of residence

Area	Male	Percent	Female	Percent	Total	Percent
Rural	259	68.16	146	68.87	405	68.41%
Urban	121	31.84	066	31.13	187	31.59%
Total	380	100	212	100	592	100

DF =1 $x^2 = 0.0317$ p = 0.858

Table 2: Distribution of deaths according to age and sex

Age	Male	Percent	Female	Percent	Total	Percent
Early neonate < 7 Days	14	3.68	13	6.13	27	4.56
Late neonate 8-28 Days	09	2.37	10	4.72	19	3.21
29 days to 1 year	02	0.53	08	3.77	10	1.69

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1 to 5 years	05	1.32	09	4.25	14	2.36
6 to 10years	07	1.84	01	0.47	08	1.35
11 to 19 years	08	2.11	13	6.13	21	3.55
20 to 40 years	67	17.63	38	17.92	105	17.74
41 to 60 years	141	37.11	63	29.72	204	34.46
61 to 80 years	112	29.46	49	23.11	161	27.20
> 81 years	15	3.95	08	3.77	23	3.87
Total	380	100	212	100	592	100

DF = 7 x^2 = 21.79   p= 0.002*   8-28 days & 29 days to 1 year were combined and 1-5 years & 6-10 years were combined

Table 3: Distribution according to department of admission to hospital

Department	Male	Percent	Female	Percent	Total	Percent
Medicine	102	26.84	57	26.89	159	26.86
Cardiology	31	8.16	25	11.79	56	9.46
Surgery	30	7.89	08	3.77	38	6.42
Nephrology	10	2.63	04	1.89	14	2.36
Plastic Surgery	02	0.53	0	0	02	0.34
Gastroenterology	03	0.79	0	0	03	0.51
Neurology	22	5.79	13	6.13	35	5.91
Neurosurgery	13	3.42	02	0.94	15	2.53
OBG	-	-	9	4.25	09	1.52
PICU	18	4.74	18	8.49	36	6.08
NICU	21	5.53	27	12.74	48	8.11
Oncology	01	0.26	0	0	01	0.17
Covid 19	127	33.42	49	23.11	176	29.73
Total	380	100	212	100	592	100

DF = 7 x^2 = 35.46   p= <0.01*

Plastic surgery, Gastro, oncology & surgery were combined Neurology and neurosurgery were combined OBG & NICU were combined

Table 4: Distribution of male and female deaths according to type of communicable and non communicable disease

Communicable disease	Male	Percent	Female	Percent	Total	Percent
Covid 19	127	33.42	49	23.11	176	29.73
Infectious & parasitic disease	034	8.95	15	7.08	49	8.28
Inflammatory disorders of CNS	019	5.00	08	3.77	27	4.56
Infections specific to Perinatal period	007	1.84	08	3.77	15	2.53
Respiratory infections	026	6.84	14	6.60	40	6.76
Infections of skin and subcutaneous tissue	013	3.42	03	1.42	16	2.70
Total	226	59.47	97	45.75	323	54.56
Non Communicable disease	Male	Percent	Female	Percent	Total	Percent

RTA	14	3.68	03	1.42	17	2.87
Genitourinary	17	4.47	8	3.77	25	4.22
Pregnancy, childbirth, puerperium	-	-	9	4.25	09	1.52
Perinatal conditions	16	4.21	20	9.43	36	6.08
Digestive system	23	6.05	05	2.36	28	4.73
Respiratory System	10	2.63	06	2.83	16	2.70
Cardiovascular disease	59	15.53	52	24.53	111	18.75
Tumors	7	1.84	06	2.83	13	2.20
Snake bite	1	0.26	01	0.47	02	0.34
Burns	2	0.53	02	0.94	04	0.68
OP Poisoning	4	1.05	03	1.42	07	1.18
Dog bite	1	0.26	0	0	01	0.17
Total	154	40.53	115	54.25	269	45.44

CD   DF = 5 x^2 = 5.727   p= 0.337

Pregnancy & perinatal were combined, Snake, burn, OP poisoning & dog bite were combined

NCD   DF=7 x^2 = 22.3   p value= 0.0022*

Table 5: Age distribution of Covid 19 deaths

Age	Male	%	Female	%	Total	%
1-5 years	0	0	01	2.04	01	0.57
21-30 years	05	3.94	01	2.04	06	3.41
31-40 years	16	12.60	05	10.20	21	11.93
41-50 years	26	20.47	10	20.41	36	20.45
51-60 years	36	28.35	16	32.65	52	29.55
61-70 years	30	23.62	11	22.45	41	23.30
71-80 years	12	9.45	03	6.12	15	8.52
81-90 years	01	0.79	01	2.04	02	1.14
>91 years	01	0.79	01	2.04	02	1.14
Total	127	100	49	100	176	100

1-5 & 21-30 were combined, 71-80, 81-90 & >90 yrs were combined

DF= 5 x^2 = 0.436   p value= 0.994

Discussion

This study analyzed the mortalities from different wards of the referral hospital in the year 2021. The preponderance of male deaths (64.19%) over female deaths (35.81%) was a similar finding of many authors.[5-8] About 70 % of the deaths were observed to be from rural areas and this finding highlights the need for quality health care in rural settings, Maximum number of deaths (34.46%) have occurred between the age of 41 to 60 years. Premature mortality by age 60 years accounted for one-third of total deaths in low and middle income countries.[8] The higher level of premature mortality is mainly due to demographic and epidemiological changes that have altered mortality levels and disease patterns across age groups.[7, 9]

Communicable diseases were the leading cause of death (54.56%) in 2021 and 29.73% of the deaths occurred in Covid wards and in them about 30% were between 51 to 60 years of age. About one-third of deaths occurred in the month of May corresponding to the third wave of Covid 19. This was a disaster of

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human mankind. With the introduction of Covishield and Covaxin on January 16th, 2021 for health care workers and later on for the elderly population and then general population, there has been a drastic reduction in the enormity of the problem

Conclusion

Statistical analysis of causes of death from mortality statistics is the backbone of National health policy and planning of health programs. It monitors the trend in public health issues like infant mortality, maternal mortality, infectious diseases, accidents and suicides.

Conflict of Interest: Nil

Source of Funding: NIL

REFERENCES

1. Godale L, Mulaye S. Mortality trend and pattern in tertiary care hospital of Solapur in Maharashtra. Indian J Community Med. 2013; 38(1):49-52.

2. Rampatige R, Mikkelsen L, Hernandez B, Riley I, Lopez AD. Hospital cause-of-death statistics: what should we make of them? Bull world Health Organ 2014, 92-3-3A.

3. Abejew AA, Tamir SA, Kerie MW. Retrospective analysis of mortalities in a tertiary care hospital in North East Ethiopia. BMC Research Notes. 2014; 7:46.

4. Hari Kumar KVS, Ajai Chandra NS. Mortality audit of medical patients at armed forces hospitals. Med Armed Forces India, 2017; 73: 299-303.

5. Khare N, Gupta G, Gupta SK, Khare s. Mortality trend in a teriary care hospital of Bhopal, Madhya Pradesh. National Journal of community Medicine 2016;7:64-7.

6. Bhatia SPS, Gupta AK, Thakur JS, Goel NK, Swami HM.Trend of cause specific mortality in Union territory of Chandigarh. IJCM 2008; 30:60-62.

7. Joshi R, Cardom M, Iyengar S. Chronic diseases now a leading cause of death in rural India- mortality data from the Andhra Pradesh rural health initiative. Int j Epidemiol 2006; 35: 1522-9.

8. Dubey M, Mohanty SK. Age and sex patterns of premature mortality in India. BMJ open 2014; 4: e 005386.

9. Quigley MA. Commentary: shifting burden of disease – epidemiological transition in India. Int J Epidemiol 2006; 35: 1530-1.

Health, Health-System and Economic Development: A South Asian Perspective

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Abstract

This study investigates the linkages between health and economic development focusing the seven South Asian (SA) countries for the period of 2000-15. Firstly, a situation analysis of major health indicators indicates that SA countries are advancing well in life expectancy, mortality and fertility rate while the burden of diseases is shifting from infectious diseases to noncommunicable diseases. The study finds that private sources mainly out of pocket health expenditure dominates the total spending on health care. Using the linear regression method, the research also finds that health expenditure growth is positively correlated with Nominal GDP growth in this region. This study also discusses the health facility situations and finds that health workforce deficiency challenge is critical in SA countries. This research also recommends that closing gaps in primary care, strengthening accessibility of health care and making progress in health determinants are necessary to expand Universal Health Coverage (UHC) in the SA region. Finally, the study has listed the major policy interventions in the SA countries and highlighted a couple of areas to be addressed for health sector advancement.

Key words: Health system, south asia, Health, economic development

Introduction

Relationship between health care expenditure (HE) and gross domestic product (GDP) varies globally with national income level across time. Investment in health sector is instrumental for economic development of all countries[3]. WHO report (2010) shows that the economic growth rate increased by 0.35% per year for every increase in life expectancy at birth by 10%. Commonly, high-income countries have more per capita HE, which also indicates that the rapid economic growth may stimulate national health care spending growth[8,16]. Likewise, share of HE in GDP varies from country to country based on their development status. HE has also been credited

for extended life expectancy at birth (LEB) and reducing infant mortality since people tend to pay more attention to quality of life with rapid economic development[17,19]. LEB is a key determinant of health status and economic growth of a country. There are multiple channels through which economic growth affects life expectancy. Besides HE, socio economic and environmental factors are identified as possible determinants of life expectancy. Improved sanitation and clean water availability have strong correlation with life expectancy too[4,11,12,18].

South Asia is home to a quarter of the world population[21]. Economy of this region which adopted globalization, liberalization and macro-economic

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reforms in last couple of decades, is one of the fastest growing economy in the world. Though, South Asian economy showed strong GDP growth from 6.2 percent to 7.5 percent between 2013 and 2016, GDP growth of Pakistan, Sri Lanka and Nepal was below 5 percent in 2016. Like other diversities in terms of size, population, social and political structure, cross-country variations in productivity and growth levels in economy are also evident in this region. Despite rapid economic growth of this region, 31 percent of the population are deprived of more than one dimension such as health, education and living standards. Health disparities are increasing significantly in SA region due to rapid but inequitable socioeconomic development, different pace and patterns of demographic and epidemiological transitions[2,14]. Rapid economic growth of South Asia has also been attributed to air pollution which is contributing to between 13% and 21.7% of all deaths through chronic and acute respiratory and cardiovascular illness[15].

There is a strand of literature focusing the health outcome and health expenditure in the OECD and African regions[5,6,7,9]. Comparatively research on the similar issue is few for SA countries[19]. Moreover, the studies on SA countries does not provide a complete diagnostics covering health indicators, health financing, economic development, health facilities and health policies altogether. The major motivation of this study is to fill up this research gap by presenting an all-encompassing picture of SA by exploiting the latest health data.

Cross country studies on health system help to understand progress of each country against health system targets, to identify variations among countries and to review policies and programs. Countries with differences and similarities can learn from each other from this kind of comparative researches, in order to seize and spread good practices in health system. Therefore, Comparing the health status of the populations, identifying health workforce challenges, bridging between HE growth and GDP growth and understanding influences of socio-economic and environmental factors on life expectancy are crucial for the policy makers to implement evidence-based policies and interventions in health care system. Though, the health challenges are similar in nature in this region, it is less clear whether there are

differences among SA countries in their health care system determinants and health policies which this study attempts to address.

This paper examines the trend in health status of six SA countries i.e. Bangladesh, Bhutan, India, Maldives, Nepal, Pakistan and Sri Lanka over the time from 2000 to 2015. Afghanistan was not included in these analyses since this country joined SA in 2007. In this research, health financing and health facilities including health workforce across the countries have also been analyzed. This paper scrutinizes relationship between health expenditure growth (HEG) and GDP growth using linear regression model too. Recent health policies of these countries are being assessed to identify the similarities and differences in their pursuit of health policies.

Methodology

This study exploits the secondary data on both health finance and health indicators of the seven South Asian countries collected from World Bank's data portal, World Development Indicators(WDI). The longitudinal availability of the data for the time period of 2000-2015 has been transformed into infographics, preferably different types of bar and line diagrams to present the cross country comparison. The analysis has been extended to simple linear regression to grasp the relation between health expenditure and nominal GDP growth in all the mentioned countries. Translating the quantitative indicators in policy implication for the SA countries is an important dimension of the paper.

Results

1.0 Situation Analysis Major Health Indicators and Diseases

Life Expectancy:

Life expectancy at birth and mortality rate are two most critical demographic determinants used to monitor progress in the health of various populations. LEB has increased steadily for last 15 years (2000-2015) in all SA countries while Maldives, Bhutan, Nepal and Bangladesh show the fastest increase in LEB among these countries. Least improvement in LEB is observed in Pakistan while Maldives possess the highest increase in LEB in this region.
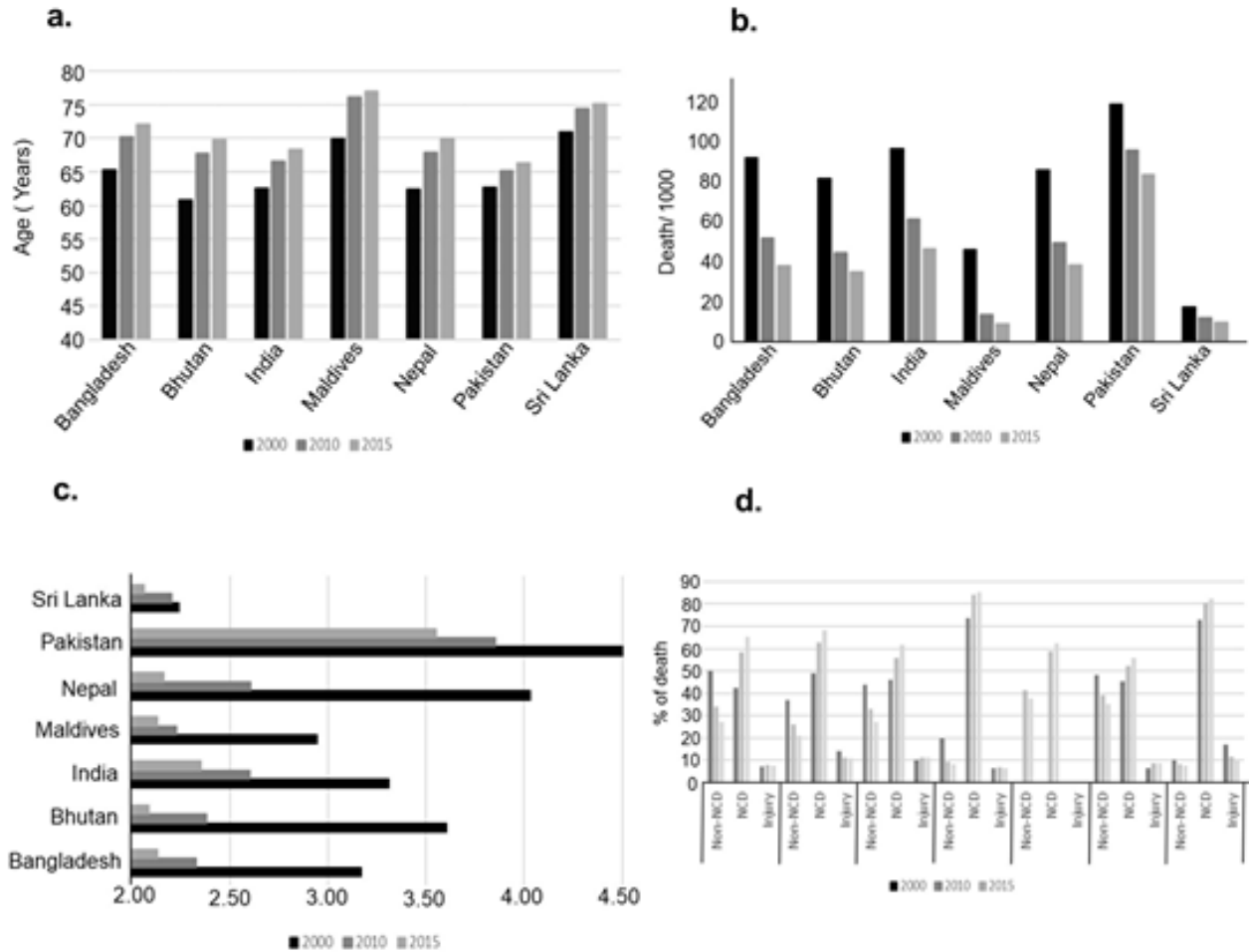
Fig 1. Major health indicators and diseases in South east asia. a. Trends of Life Expectancy at Birth (LEB) in SA countries, 2000-2015. b. Trends of Mortality under 5 years per 1000 live births in SA countries, 2000-2015. c. Trends of Fertility Rate (births per woman) in SA countries, 2000-2015. d. Shift from communicable diseases to NCDs in SA countries, 2000-2015

Life expectancy at birth (LEB) increases in SA region as death toll falls:

LEB of Pakistan, Nepal, India and Bhutan was below 65y (y=years) in 2000. Bangladesh marginally crossed the land mark of 65y in 2000. Bhutan, Nepal and Maldives improved their LEB by 9y,7.5y and 7.1y respectively from 2000 to 2015 while the LEB of other countries like Bangladesh and India increased by 6.8y and 5.7y respectively. LEB of Pakistan showed smallest gains (3.6y) over the same time period among these seven countries. Sri Lanka gained only 4.1y over these time period, though, this country has the second highest LEB (75.1y) in 2015. However, the average LEB of SA countries rose by 6.3y over the period between 2000 and 2015(Fig1a).

Mortality Rate:

Mortality under-five strongly influences the changes in LEB over time in the population. The overall mortality rate of children under-five of SA countries has significantly improved by declining 51.4 percent from 73.0 under-five deaths per 1,000 in 2000 to 37.6 in 2015. Mortality under-five was considerably low in Maldives (8.8/1,000) and Sri Lanka (9.5/1,000) in 2015, dropped by 79.9 and 42.4 percent from 2000 to 2015 respectively. Under-five mortality rate has declined by more than half in Bangladesh (58.4%), Bhutan (57.0%), Nepal (55.1%) and India (51.9%) between 2000 and 2015.Though the mortality rate under-five of Pakistan decreased by 29 percent from 2000 to 2015, still this country holds the highest mortality rate (79.5/1,000) in this region in 2015(Fig1b).

Fertility Rate:

Fertility rate(FR), births per women declines in SA region during the time period 2000-2015(Fig.1C). Among all SA countries, the lowest FR was registered in Sri Lanka (2.2) followed by Maldives (2.9) in 2000. The highest FR was in Pakistan (4.6) followed by Nepal (4), Bhutan (3.6), India(3.3), and Bangladesh(3.1). FR declined in Sri Lanka and Maldives to 7.9% and 27.6% over the 2000-2015 respectively. FR fell significantly in Nepal(46.4%) and Bhutan(41.1%) tailed by Bangladesh (32.7%) and India (29%) during this time period(fig.1c).

The burden of diseases is shifting from infectious diseases to noncommunicable diseases in SA countries:

Total disease burden of each country is disaggregated across three main categories: Non-communicable disease, communicable disease and injuries. Communicable disease category includes all death by infectious diseases,maternal, prenatal and nutrition diseases. At the SA regional level, in 2015 more than 69 percent (69.8%) of death burden results from NCD which is 14.9 percent points more than that of 2000.Injuries held the least share 9.1 percent in 2015 which was just over 10 percent in 2000. Only the death by injuries decreased by 7 percent points in Sri Lanka among these countries from 2000 to 2015. This shift in death burden towards NCDs since 2000 resulted from a significant reduction in communicable and preventable diseases. Death burden of NCD was higher in Maldives and Srilanka than other SA countries while the shifting of death burden from communicable to non-communicable was the highest in Bangldesh(fig1. d).

Since 2000, NCD imposed the largest death burden in Maldives and Sri Lanka. NCD deaths accounted for a massive 73.6 percent and 72.9 percent of all deaths in Maldives and Sri Lanka in 2000 which increased by 11.6 and 9.6 percent points in 2015 respectively. Though, NCDs account for less than 50 percent of total death burden in rest of the SA countries in 2000, it increased by 22.8 percent point in Bangladesh, 19.4 percent point in Bhutan, 15.6 percent point in India and 10.5 percent point in Pakistan in 2015. Share of death due to communicable diseases decreased in Bangladesh,India, Bhutan and Pakistan by 23, 16.8,16 and 12.8 percent points respectively from 2000 to 2015. Data from Nepal was not available for 2000, therefore, could not incorporate in the analysis (fig1.d)

2.0 Health Expenditure: Composition and Trend

Private sources chiefly out of pocket health expenditure dominates the total spending on health care:

Health care expenditure is significantly correlated with life expectancy and mortality of different populations (Jaba, 2014). Globally, most of the countries experienced steady increase of longevity and decrease of children under five mortality rate accompanied with a growth of the health expenditure.

The average capital health expenditure (CHE) of five SA countries was 0.6 in 2000 (% of GDP) which decreased by 0.3 percent points in 2014. Nepal and Pakistan were excluded from this analysis since data were not available in the data source. Among these countries, CHE of Bhutan was the highest while the lowest CHE was documented in Bangladesh (0.2) in 2014.
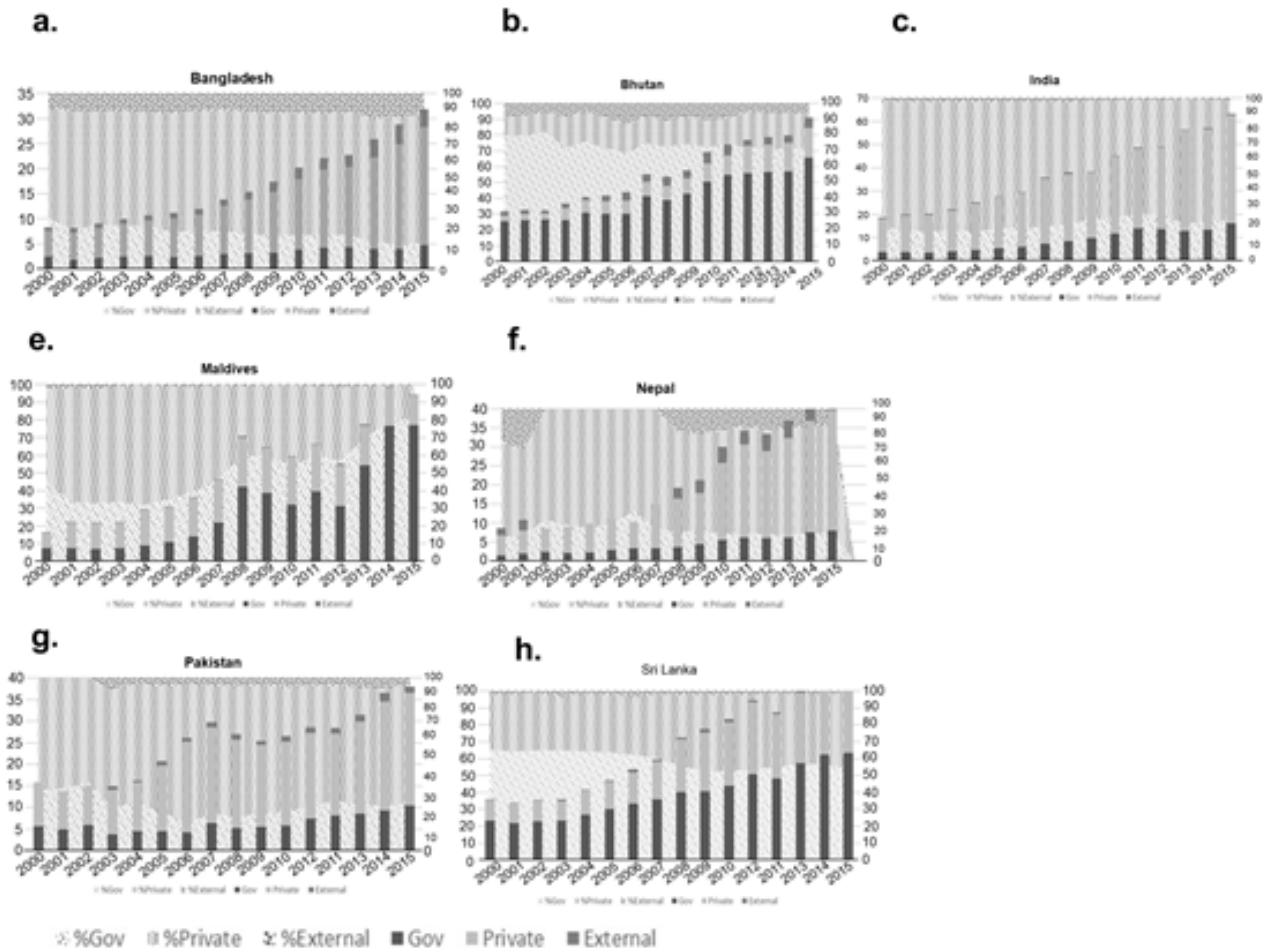
Fig 2. Composition of total Health Expenditure per capita across the SA countries, 2000-2015. Primary axis represents amount of health expenditure per capita by US$ while secondary axis represent the composition of health expenditure in percentage

Compared to other SA countries, total health expenditure (THE) per capita was significantly higher in Maldives (943.9 $), Sri Lanka (117.9$) and Bhutan (91.1$) in 2015. On average rest of the countries spent only 44 $ per capita on health. The lowest per capita spender on health of this region is Bangladesh with 32 $ followed by Pakistan (37.9$), Nepal (44.4$) and India (63.3$) in 2015. However, THE per capita increased by 780$, 81.8$,59.3$,44.8$, 35.8$,22.1$ and 8$ in Maldives, Sri Lanka, Bhutan, India, Nepal, Pakistan and Bangladesh respectively from 2000 to 2015.

The private health expenditure (PHE) per capita which includes funds from households, corporations and non-profit organizations shares the foremost part of Total health expenditure per capita in SA except

Maldives, Bhutan and Sri Lanka since 2000. PHE per capita accounted for 63 percent in 2000 which increased 11 percent points in 2015 in Bangladesh, the highest in this region. PHE per capita increased by 10.5, 8.9, 8.4 and 4.2 percent points in Sri Lanka, Bhutan, Nepal and Pakistan respectively from 2000 to 2015. Share of PHE per capita in THE decreased in Maldives and India by 34.6 and 3.1 percent points from 2000 to 2015 respectively.

Share of government health expenditure (GHE) per capita decreased by 14, 11.4, 7.9 and 7.8 percent points in Bangladesh, Sri Lanka, Pakistan and Bhutan respectively from 2000 to 2015. On the contrary, government contribution shared 81.6,72.1 and 53.7 percent of THE in Maldives, Bhutan and Sri Lanka respectively in 2015 which is significantly higher than

other SA countries. Contribution of external health expenditure per capita which comprises of direct foreign transfers and foreign transfers distributed by government decreased in all SA countries except Bangladesh from 2000 to 2015. External sources were negligible with 0.39, 0.9 and 1.1 percent in Maldives, India and Sri Lanka respectively in 2015. External share per capita dropped by 11 percent points from 2000 to 2015, which is the highest in all these countries in Bangladesh contribution of external sources increased gradually by 3 percent points from 2000 to 2015 (Fig.2).

3.0 Health Expenditure and GDP

Health Expenditure growth is positively correlated with Nominal GDP Growth in SA countrie

The examination of the percentage point differences between Health expenditure growth and nominal GDP growth is performed by plotting the nominal GDP growth (%) in the horizontal axis and HEG (%) in the vertical axis from cross sectional data of SA countries. The analysis was performed for every SA country separately with the continuous data from 2000 to 2016 to observe the relationship between nominal GDP growth and HEG over time. All countries of this region show positive correlation between nominal GDP growth and HEG, so that the fitted regression lines also yielded a positive sloped line. A highest significant positive correlation between nominal GDP growth and HEG is observed where the model explains 40 percent of variation within the data. Positive relationship remains significantly pronounced in Bangladesh, Pakistan and Bhutan where models explain 42, 24 and 47 percent of variation within the data respectively. The lowest correlation between these two indicators are observed in Sri Lanka followed by India. Regression analysis for Nepal could not be performed due to data unavailability (Fig. 3).
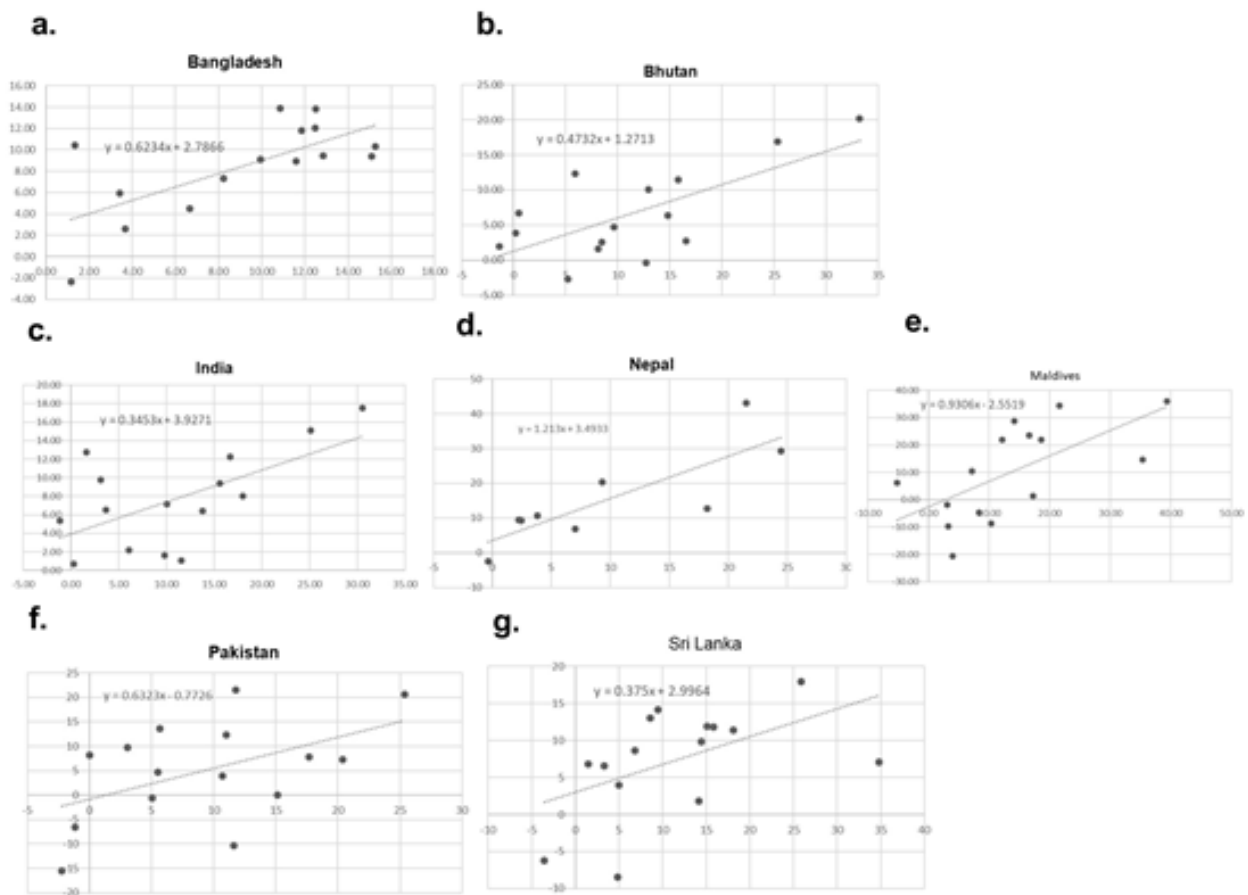
Fig. 3: Correlation between Health Expenditure growth and Nominal GDP Growth in SA countries

4.0 Health System

Health workforce deficiency challenge is critical in SA countries

Inadequate qualified health workforce (HWF), an identified serious threat to the attainment of the SDGs goals, is a mutual scenario of SA region. This cross-country study has identified a lack of comprehensive and comparable data in health care for most of the countries of this region. Therefore, this analysis has been performed on the available data for each country ranging from 2000 to 2016. Nepal was excluded from this analysis for that reason. None of these countries met the minimum threshold of 2.3 doctors, nurses and dentist per 1,000 population established by WHO till 2015 for health system to perform optimally. However, net physician increased 365 percent in Maldives from 2000 to 2015 followed by approximately 108 percent in Sri Lanka, 94 percent in Bangladesh, 74 percent in Bhutan, 47 percent in Pakistan and 38 percent in India within this time frame. In addition to shortage of HWF, a gross imbalance in the skill-mix of health workforce particularly with doctor-nurse(midwives) ratio, is a significant workforce challenges in this region. Though nearly every country of SA has increased their nurse and midwives' densities over the last one and half decades (2000-2015), Bangladesh, India and Pakistan are still away from the threshold of doctor to nurse ratios of 1:3 recommended byWHO. Maldives increased the number approximately by 178 percent followed by Sri-Lanka (134 percent), India (79 percent), Bhutan (70 percent), and Pakistan (16 percent) during this time period. Alike other SA countries, number of nurse and midwives in Bangladesh has slightly decreased (0.4 percent) in 2015 from 2000. In 2015, doctor to nurse and midwives' ratios were 4.2 in Bhutan, 3.2 in Sri-Lanka, 2.27 in Maldives, 0.8 in India, 0.6 in Bangladesh and 0.5 in Pakistan. On the other hand, community health worker (CHW) densities have increased by approximately 215 percent in Bangladesh,123 percent in Pakistan, 75 percent in India and decreased by 74 percent in Bhutan and 17.1 percent in Maldives from 2000 to 2015/2016 (Fig.4).
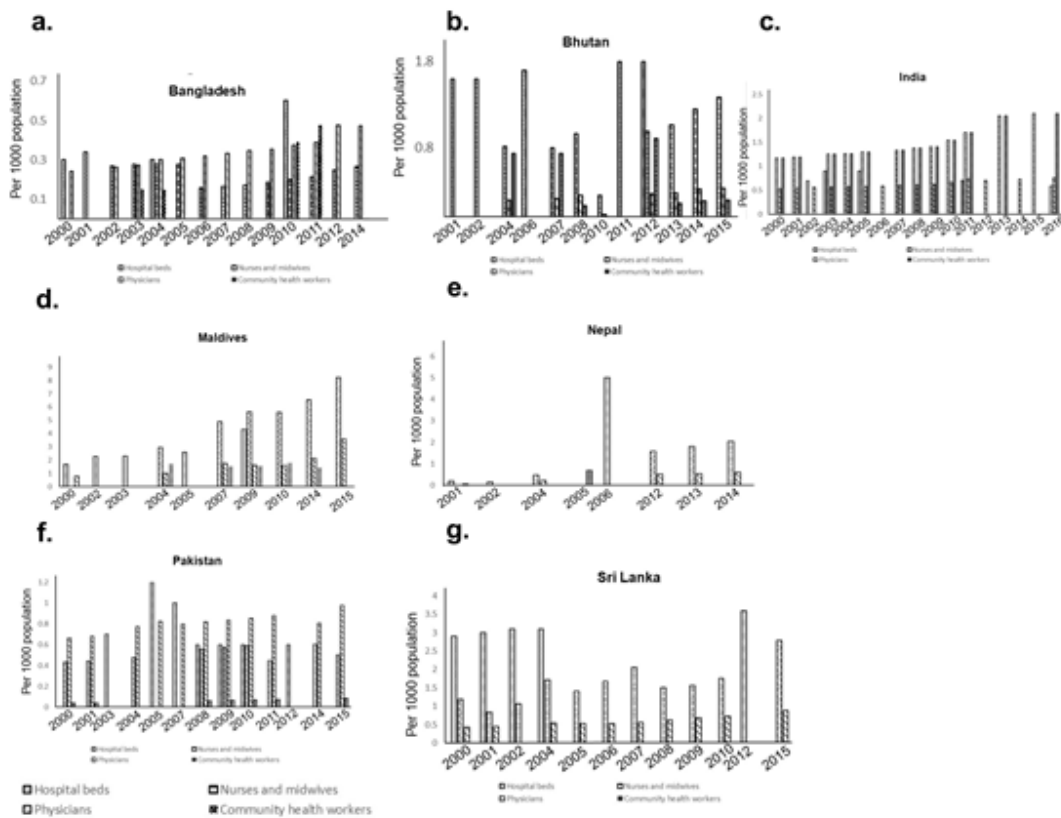
Fig 4. Health Facilities in SA Countries, 2000-2015

Closing gaps in primary care, strengthening accessibility of health care and making progress in health determinants are necessary to expand Universal Health Coverage (UHC) in SA region:

UHC index supports countries in tracking their progress in reproductive, maternal, newborn and child health, infectious diseases, non-communicable diseases and service capacity and access and health security. The current values for UHC index ranged from 40 to 62 across the SA countries, which are under the global median average of 65 (SDG report, 2015). Sixteen tracer indicators which were used to develop UHC index, are categorized in four tracer areas:

Reproductive, maternal, newborn and child health:

Among five tracer indicators, large gaps persist in health seeking behavior for child pneumonia and pregnancy care in most of the countries. Compared to other countries, percentage of care seeking for symptoms of pneumonia is significantly higher in India (77%) and Bhutan (74%). The highest portion of children (78 percent) of Maldives did not seek treatment for pneumonia symptoms followed by 58 percent in Bangladesh, 50 percent in Nepal, 42 percent in Sri Lanka and 36 percent in Pakistan in 2015.

While 93, 85 and 85 percent of mothers of Sri Lanka, Maldives and Bhutan respectively received basic interventions for four or more times, 69, 63, 52 and 40 percent of mothers received no or less than four times interventions in Bangladesh, Pakistan, India and Nepal correspondingly.

51 percent women of Pakistan followed by 47 percent of Maldives have inadequate coverage for family planning. Rest of the countries covered more than 65 percent women under family planning program.

Infectious diseases:

On average 70.5 percent tuberculosis (TB) incidents were successfully treated in Bhutan and Nepal in 2015. However, TB effective treatment coverage was significantly low in Maldives (30 %) followed by India (44%), Bangladesh (53%), Pakistan (59%) and Sri Lanka (58%).

Nearly 95 percent households of Maldives and Sri Lanka had access to at least basic sanitation and water

source in 2015, which is significantly higher than other SA countries. More than 50 percent households had insufficient basic water and sanitation facilities in India (56%), Nepal (54%) and Bangladesh (53%) while more than 39 percent households of Pakistan (42%) and Bhutan (37%) had no access to basic water and sanitation.

Non-communicable diseases:

The prevalence of hypertension (cardiovascular diseases) and mean fasting plasma glucose (mmol/L) (Diabetes) are used in UHC index as proxy measures, which are meaningful as indicators of both the success of prevention efforts and screening and treatment programs. The average prevalence of normal blood pressure and mean fasting plasma glucose (including those whose blood pressure/ Diabetes were controlled by medication) were 73.6 percent and 5.4 mmol/L in this region in 2015. 30% individuals had untreated high blood pressure in Nepal and Pakistan respectively which is the highest among these countries.

Among these countries, the highest 29 percent individuals used Tobacco in Maldives followed by Nepal (24%), Bangladesh (23%), Pakistan (20%), Sri Lanka (14%) and India (12%) in 2015. Only 6 percent individuals of Bhutan used tobacco that year.

Service capacity and access:

Bangladesh, India, Pakistan and Nepal had less than 10 beds, physicians and physicatrist per 10,000 population while less than 10 surgeons in Bhutan, Nepal and Sri Lanka in 2015. In comparison to other countries of this region, Maldives had the highest density of hospital beds (43), physicians (16), psychiatrist (37) and surgeons (88) per 10,000 population in 2015. Nepal had the lowest density of hospital beds (3), physicians (2), psychiatrist (2) and surgeons (9) per 10,000 population.

5.0 Policy: Situation and Implication

The SA countries have made remarkable progress in the health of their population in the recent years, but presently face the challenges of non-communicable disease as discussed previously in the study. SA countries have adopted a wide range of health sector programmes and interventions. A synopsis of the

current ongoing health interventions in SA countries have been listed in the annex. Primary healthcare should be integrated as a core component in health systems where SA countries are lagging behind. SA countries are investing less than 4% of their GDP on health sector resulting in insufficient investment in health facilities and less priority of specialty training in the community set up. This region is in urgent need of a strong and wel-functioning primary healthcare system. Nutrition interventions which are insufficient and sporadic in this region, covers only small portion of total population. Therefore, robust and expanded nutritional programmes need to be launched in the region.

Though SA countires have progressed in recent years in health sector, there is a real need to review their strategies for meeting the health needs of their populations.

- Governments along with private sectors required to monitor progresses and trends of Communicable and NCDs and their risk factors to direct policy and priorities.

- Public sector investment in health is low. So more investment needs to be mobilized from public sector.

- Under 5 mortality is still high. Therefore, dedicated programmes need to be taken in SA countries.

- High impact essential NCDs interventions such as early detections and timely treatment of NCDs through primary health care approaches can reduce the common modifiable risk factors. Collaborations among all sectors including health, finance, transport, education, agriculture, planning and others are required for efficient NCD managements in SA countries.

- Health care coverage needs to be expanded through dedicated programs and investment in health.

- Health service capacity and access need to be enhanced through providing more physician and hospital beds.

- As complementary to health sector development, special programs on sanitation and fresh water access need to be expanded.

- North-South and South-South collaboration should be sough out to address the challenges among the SA countries.

Ethical clearance: We did not approach to any committee for ethical clearance as we used secondary publicly avaible data for this study**.**

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Conflict of Interest: The authors declare no competing interests.

References

1. Ahlquist, J.S., Breunig, C. Country clustering in comparative political economy. Max-Planck Institute for the Study of Societies, Cologne; 2009.

2. Anand, S. & Barnighausen, T.Human Resources and Health Outcomes: Cross- country econometric study. *The Lancet*, 2004 364:1603–1609.

3. Anyanwu, C.J. & Erhijakpor, E. O. A. Health expenditures and health outcomes in Africa, African Development Bank Economic Research Working Paper No. 2007.

4. Alemu, A. M. To what extent does access to improved sanitation explain the observed differences in infant mortality in Africa?. *African journal of primary health care & family medicine*,2017; *9*(1), e1–e9. https://doi.org/10.4102/phcfm.v9i1.1370

5. Arthur, E. & Oaikhenan, H.E. The effects of health expenditure on health outcomes in sub-Saharan Africa (SSA) *Afr Dev Rev*.2017.29(3):524–536. doi: 10.1111/1467-8268.12287.

6. Ashiabi, N., Nketiah-Amponsah, E. & Senadza, B. The effect of health expenditure on selected maternal and child health outcomes in -Saharan Africa. *Internat J Soc Econ*.2016. 43(12):1386–1399. doi: 10.1108/IJSE-08-2015-0199.

7. Bein, M.A., Unlucan, D., Olowu, G. & Kalifa, W. Healthcare spending and health outcomes: evidence from selected east African countries. *Afr Health Sci*.2017.17(1):247–254. doi: 10.4314/ahs.v17i1.30.

8. Bloom, D., Canning, D. & Sevilla, J. The effect of health on economic growth: a production function approach. *World Development*. 2004.32(1):1–13. doi: 10.1016/j.worlddev.2003.07.002.

9. Berger, M. C. & Messer, J. Public financing of health expenditures, insurance and health outcomes. 2002.*Appl Econ*. 34:2105–2113. doi: 10.1080/00036840210135665.

10. Commission on Macroeconomics and Health . Macroeconomics and Health: Investing in Health for Economic Development. Geneva: WHO; 2001.

11. Gakidou, E. Improving child survival through environmental and nutritional interventions: The importance of targeting interventions towards the poor. *J Am Med Assoc*. 2007.298:1876–1887

12. Irwin, A., Valentine, N., Brown, C, Loewenson, R., Solar, O., Brown, H. et al. The Commission on Social Determinants of Health: Tackling the Social Roots of Health Inequities. *PloS Medicine*;2006. (6): e106

13. Jaba, E., Balan, C. & Robu, L,. The Relationship between Life Expectancy at Birth and Health Expenditures Estimated by a Cross-country and Time-series Analysis. *Procedia Economics and Finance*. 15. 2004.108-114. 10.1016/S2212-5671(14)00454-7.

14. Kanchanachitra, C., Lindelow, M. & Johnston, T. Human resources for health in southeast Asia: shortages, distributional challenges, and international trade in health services. *Lancet*. 2011.10.1016/S0140-6736(10)62035-1 published online Jan 25.

15. Krishna, B., Balakrishnan, K., Siddiqui, A.R., Begum, B.A., Bachani, D.& Brauer, M. Tackling the health burden of air pollution in South Asia. *BMJ*. 2011.359:j5209. doi:10.1136/bmj.j5209

16. Novignon, J., Olakojo, S.A. & Nonvignon, J. The effects of public and private health care expenditure on health status in sub-saharan africa: new evidence from panel data analysis. *Heal Econ Rev*.2012. 2:22. doi: 10.1186/2191-1991-2-22.

17. Pinzón-Flórez, C.E., Fernández-Niño, J.A., Ruiz-Rodríguez, M., Idrovo, Á.J., Arredondo, L.. Determinants of performance of health systems concerning maternal and child health: a global approach. *PLoS One*.2015.10(3):e0120747. doi:10.1371/journal.pone.0120747

18. Pruss, A., Kay, D., Fewtrell, L., Bartram, J. Estimating the burden of disease from water, sanitation, and hygiene at a global level. *Environ Health Perspect*.2002.110(5):537–542

19. Rahman, M.M., Khanam, R.& Rahman, M. Health care expenditure and health outcome nexus: new evidence from the SA-ASEAN region. Globalization and health,2018. *14*(1), 113. https://doi.org/10.1186/s12992-018-0430-1

20. WHO. World health statistics. Geneva.2010.

21. World Bank. World Development Indicators Database.2020.

22. World Bank Data of South Asia. 2020. (https://data.worldbank.org/region/south-asia)

A Study to Assess Knowledge, Attitude and Practices on the basis of Scoring Related to Bio-Medical Waste Management among Health-care Personnel in Secondary Care Hospitals of Prayagraj, District

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Abstract

Background: Biomedical waste (BMW) management remains a problem area in India. Proper management depends upon knowledge and attitude of waste generating staff and other personnel involved.

Objective: To assess Knowledge, Attitude and Practice regarding bio-medical management among health-care personnel by using a scoring system in secondary care hospitals in Prayagraj district.

Methodology: Sample size was calculated to be 470. The study subjects were selected from each stratum of personnel randomly in proportion to the size of strata from both urban and rural. Data was collected using questionnaire and assessment of knowledge, attitude and practices was done on the basis of scoring system described by Kaliyaperumal.

Results: It was observed that in urban hospitals 60.91% doctors, 58.25% nurses, 44.45% lab technicians and 30.76 % sanitary staff were having high level of knowledge with a score of >20 and in rural hospitals, 38(54.2%) doctors, 20(47.61%) nurses, 9(32.14%) lab technicians and 8(22.85%) sanitary staff were having high level of knowledge. In urban hospitals,{70 (80.45%) doctors, 91(88.34%) nurses, 23(85.18%) lab technician and 65(80.76%) sanitary staff and in rural hospitals, {58(82.85%) doctor, 39(92.85%) nurses, 22(78.57%) lab technician, and 31(88.57%) sanitary staff} were having favourable attitude with a score of >6. In both urban and rural hospital, the practice scores of majority of healthcare personnel were satisfactory i.e. in the range of (3-6).

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Conclusion: The study revealed that the attitude among health-care personnel was good while knowledge and practice were satisfactory.

Keywords: Biomedical waste management, Knowledge, Attitude and Practice (KAP), Health-care personnel

Introduction

Biomedical waste (BMW) is waste generated during diagnosis, treatment or immunization of human beings or animals, or in research activities pertaining thereto, orin the production and testing of biologicals, and is contaminated with human fluids.[1]

In developing countries like India, still at many places, this waste is carried to the outskirts of the city and dumped indiscriminately in a most insanitary way. Indiscriminate disposal of these wastes and exposure to such waste poses a serious threat to the environment and to human health and may cause the transmission of many diseases. Bio- medical waste requires specific treatment and management prior to its final disposal.

The severity of the threat is further compounded by the high prevalence of diseases such as human immunosuppressive virus (HIV) and hepatitis B and C.[2] There is a great risk of being infected or injured to medical professionals like doctors, nurses, technicians, visitors, sanitary staff or general public, if biomedical waste is not handled properly. [3]

During 1994-95, the government of India, under the directions of the Supreme Court, ordered medical establishments not to discard medical waste in municipal bins but to burn it in incinerators installed in their premises[4]. In 1998, the Government of India framed the 'Biomedical wastes (Management and Handling) Rules which were amended in June 2000 and further in 2016. Bio-medical waste management, 2016 Rules came into being to improve compliance and strengthen the implementation of environmentally sound management of biomedical waste in India.

Here it is estimated that annually about 0.33 million tons of hospital waste is generated in India and, the waste generation rate ranges from 0.5 to 2.0 kg per bed per day5. Those who are following BMW management rules are not doing that properly. This all depends upon the knowledge, attitude and practices of the healthcare personnel associated with the facility. Proper segregation and disposal can only be practiced if knowledge is proper and attitude is favourable of each and every one responsible for it.

It is obvious that segregation of waste is the responsibility of those generating the waste. Further proper treatment and disposal is the responsibility of various other workers including waste collectors and ultimate responsibility is of the hospital.

Assessment of knowledge and attitude with the help of a KAP study may give us insight into the reasons behind the problem of not proper disposal of BMW. KAP study tells us about knowledge possessed by a community and the ways in which they demonstrate their knowledge and attitude through their actions. Hence the present study was undertaken in Prayagraj district to assess the knowledge, attitude & practices in bio- medical waste management among healthcare personnel in various health care settings with the following objectives.

1. To assess the level of knowledge (awareness) among health care personnel involved in bio-medical waste management.

2. To assess the attitude and practices of bio-medical waste management among the same.

Methods

Study design: Cross – Sectional study

Study setting: Urban & Rural secondary care hospitals of Prayagraj

Study duration: The study was conducted for the duration of period of one year (May 2019 – May 2020)

Study population: All personnel involved in handling biomedical waste management in health care facilities.

This cross-sectional study was carried out in Prayagraj district from May 2019 to May 2020. Firstly, listing of all the personnel involved in

biomedical waste management (doctor, nurses, lab technician, sanitary staff) was done both for rural and urban secondary care government hospitals. A total 615 personnel were listed in urban and 363 in rural secondary care hospitals. Then separately for both urban and rural personnel in secondary care hospitals, four strata were created namely (doctor, nurses, lab technician, and sanitary staff).

In urban hospitals, 181 doctors, 214 nurses, 58 lab technicians and 162 sanitary staff were there. In rural hospitals, 146 doctors, 88 nurses, 56 lab technicians and 73 sanitary staff were there. Total no of personnel were 978. Since sample size was calculated to be 470 (that amounts to 48% of total personnel), it was decided to select 295 personnel from urban & 175 from rural secondary care government hospitals which is in proportion (i.e. 48%) to their respective numbers in urban (615) and rural hospitals (363).

Then, the personnel were selected from each stratum randomly in proportion (48%) to the size of stratum in order to complete the sample size from urban and rural each. So, in urban hospital, 87 doctors, 103 nurses, 27 lab technicians and 78 sanitary staff were decided to be selected while in rural 70 doctors, 42 nurses, 28 lab technician, 35 sanitary staff were decided to be selected for the study.

Assessment of knowledge, attitude and practices was done on the basis of scoring system described by Kaliyaperumal[6]. For knowledge and practices, each correct response was awarded 1 score. Participants who marked all the correct options were considered as having **complete knowledge** about biomedical waste management.

For attitude, a numerical value was assigned to each choice in the range of response, with the middle response given a score of zero and positive and negative scores assigned to those around it. In this way a score was calculated for each individual in relation to the highest possible score.

Practice was assessed by asking check questions, making observations, and by asking the healthcare personnel to perform certain tasks, e.g. - for assessing the practices of segregation, a small session in OPD/WARD was observed. Similarly, for assessment of practice of cutting the hub of syringe

before disposal, a syringe was provided and they were asked to dispose it.

The data was analyzed using statistical software, SPSS Version 23. Chi-square test was used to test the associations. P-value less than 0.005 was considered as significant. This study has been approved by the institutional ethics committee, M.L.N Medical College, Prayagraj.

Inclusion criteria: Subjects willing to participate in the present study

Exclusion criteria:

1. Subjects who were not willing to participate in the present study.

2. Those who are working in medical field for less than 6 months.

Results

A total of 470 participants (87 doctors, 103 nurses, 27 lab technicians and 78 sanitary staff from urban and 70 doctors, 42 nurses, 28 lab technicians, 35 sanitary staff from rural) took part in the study. Table 1 shows that in urban hospitals, 53(60.91%) Doctor, 59(58.25%)nurses, 12 (44.45%) lab technicians and 24(30.76%) sanitary staff were having high level of knowledge and awareness towards biomedical waste management with a score of >20. 34(39.08%) doctors, 44(42.71%) nurses, 15(55.56%) lab technicians and 52(66.67%) sanitary staff were having medium level of knowledge and awareness with a range of 10-20. Only 2(2.56%) sanitary staff were having low level knowledge with a score of <10. As compared to urban hospital, in rural hospital 38(54.2%) doctors, 20(47.61%) nurses, 9(32.14%) lab technicians and 8(22.85%) sanitary staff were having high level of knowledge, whereas 32(45.71%) doctor, 22(52.38%) nurses, 19(67.8%) lab technicians and 23(65.71%) sanitary staff were with medium level of knowledge and awareness, 4(11.42%) of sanitary staff were having low level knowledge with a score of <10.

In urban hospitals 70 (80.45%) doctors, 91(88.34%) nurses, 23(85.18%) lab technician and 65(80.76%) sanitary staff were having favourable attitude with a score of >6, whereas 17(19.54%) doctors, 12(11.65%) nurses, 4(14.81%) lab technicians and 10(12.82%) sanitary staff were having less favourable attitude.

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Around 3(3.86%) of sanitary staff were having least favourable attitude. Similarly in rural hospitals 58(82.85%) doctor, 39(92.85%) nurses, 22(78.57%) lab technician, and 31(88.57%) sanitary staff were having favourable attitude with a score of >6. On the other hand, 12(17.14%) doctors, 3(7.14%) nurses, 6(21.42%) lab technician and 4(11.42%) sanitary staff were having less favourable attitude with a range of 3-6. In urban hospital, the practice scores of majority of healthcare personnel were in the range of (3-6) satisfactory i.e. 54(62.06%) doctors, 60(58.25%) nurses, 17(62.96%) lab technicians, 48(61.53%) sanitary staff. While 28(32.18%) doctors, 35(33.98%) nurses, 7(25.92%) lab technicians, 19(24.35%) sanitary staff were having good practice score i.e. >6. Five (5.74%) of doctors, 8(7.76%) of nurses, 3(11.12%) of lab technician, 10(12.82%) of sanitary staff were having low practice score with a range (0-3). In rural hospitals out of 70 doctors, 42 nurses, 28 lab technician and 35 sanitary staff. 41(58.57%) doctors, 28(66.67%) nurses, 21(75%) lab technician, 22(51.42%) sanitary staff were practicing at satisfactory level. 19(27.14%) doctors, 10(23.80%) nurses, 4(14.28%) lab technician and 7(20%) of sanitary staff were having good practice score i.e. >6. 10(14.28%) doctors, 4(9.52%) nurses, 3(10.71%) lab technician, 6(17.14%) were having low practice score with a range (0-3).

Table 2 shows that among health care personnel having 0-5 years of experience majority 70(54.26%) were having medium level of knowledge with a range of score (10- 20), 58(44.96%) were having high level of knowledge with a score of >20 and only 1(.77%) was having low level of knowledge with a score of <10 regarding biomedical waste management. Similarly among those having 6-10 years of experience majority of them 122(57.09%) were having medium level of knowledge followed by 85(39.71%) who were having high level of knowledge and 3(1.40%) were having low level of knowledge. Among those with>10 years of experience it can be seen that 87(68.50%) were having medium level of knowledge, 58(44.96%) were having high level of knowledge and 4(3.14%) were having low level of knowledge.

The attitude of healthcare personnel having 0-5 years of experience was mostly favourable. Majority 122(94.57%) were having favourable attitude towards biomedical waste management with a score of >6, 5(3.87%) were having less favourable

attitude with a score range of 4-6 and only 2(1.55%) were having least favourable attitude with a score in range of 0-3. On the other hand among those having 6-10 years of experience, 194 (90.65%) were having favourable attitude followed by 16(7.47%) who were having less favourable attitude and only 4(1.86%) were having least favourable attitude. In >10 years of experience category, it can be seen that 115(90.55%) were having high favourable attitude, 9(7.08%) were having less favourable attitude and 3(2.36%) were having least favourable attitude. As far as the practice score among those who had 0-5 years of experience is concerned, majority 79(61.24%) were having a satisfactory practice score (4-6), 35(27.13%) were having high practice score (>6) and 15(11.62%) were having a low practice score. Similarly, those who had 6-10 years of experience, majority 135(63.08%) were having a satisfactory practice score, 9(4.20%) were having low practice score. In >10 years of experience category it can be seen that out of 127 personnel majority 84(66.14%) were having medium practice score, 24(18.89%) were having high practice score and 19(14.96%) were having low practice score.

Table 3 shows that among those who received training during past 6 months, majority had high level 167(59.21%) of knowledge with a score of >20 while among who had not received training in last 6 months, majority of them 142(75.53%) had medium level of knowledge.

Similarly, attitude among those who received training during last 6 months was mostly favourable. Majority i.e. 273(96.80%) of them displayed favourable attitude with a score of > 6, while among those who had not received training during last 6 months, 166(88.29%) were having favourable attitude.

As far as Practice score amongst those who received training during last 6 months is concerned, 87(30.85%) were practicing biomedical waste management properly & having good practice score i.e. 186(65.95%) were having satisfactory score with a range of 4-6 and 9(3.19%) were having low score with a range of 0-3. On the other hand those who had not received training during last 6 months, 45(23.93%) were having at high practice score, 119(63.29%) were having satisfactory score and level, 24(12.76%) were having at low score.

Table 1: Knowledge Attitude and Practice Score Regarding Biomedical Waste Management Practices among Health Care Personnel in Secondary Care Hospitals

Scoring	Doctor		Nurses		Lab technician		Sanitary staff	
	Doctor (Urban)N=87	Doctor (rural)N=70	Nurses (urban)N=103	Nurses (rural)N=42	L.T (urban) N=27	L.T (rural) N=28	Sanitarystaff (urban) N=78	Sast (r N)
Knowledge								
Low (<10)	0	0	0	0	0	0	2(2.56%)	4
Medium(10-20)	34(39.08%)	32(45.71%)	44(42.71%)	22(52.38%)	15(55.56%)	19(67.85%)	52(66.67%)	23
High(>20)	53(60.91%)	38(54.28%)	59(58.25%)	20(47.61%)	12(44.45%)	9(32.14%)	24(30.76%)	8
Attitude								
Low(<3)	0	0	0	0	0	0	3	0
Medium(3-6)	17(19.54%)	11(15.71%)	12(11.65%)	3(7.14%)	4(14.81%)	6(21.42%)	10(12.82%)	4
Good(>6)	70(80.45%)	59(84.28%)	91(88.34%)	39(92.85%)	23(85.18%)	22(78.57%)	65(80.76%)	31
Practice								
Low(<3)	5(5.74%)	10(14.28%)	8(7.76%)	4(9.52%)	3(11.12%)	3(10.71%)	10(12.82%)	6
Medium(3-6)	54(62.06%)	41(58.57%)	60(58.25%)	28(66.67%)	17(62.96%)	21(75%)	49(62.82%)	22
Good(>6)	28(32.18%)	19(27.14%)	35(33.98%)	10(23.80%)	7(25.92%)	4(14.28%)	19(24.35%	7

Table 2: Knowledge Attitude and Practice Score Based on Experienceof Healthcare Personnel in Secondary Care Hospitals.

Experience	0-5 yr	6-10 yr	>10 yr
Knowledge			
Low(<10)	1(.77%)	70(54.26%)	58(44.96%)
Medium(10-20)	3(1.40%)	122(57.09%)	85(39.71%)
High(>20)	4(3.14%)	87(68.50%)	40(31.49%)
Attitude			
Low(<3)	3(2.32%)	3(1.40%)	4(3.14%)
Medium(3-6)	16(12.40%)	17(7.94%)	10(7.87%)
High(>6)	110(85.27%)	194(90.65%)	113(88.97%)
Practice			
Low(<3)	15(11.62%)	9(4.20%)	19(14.96%)
Medium(3-6)	79(61.24%)	135(63.08%)	84(66.14%)
High(>20)	35(27.13%)	70(32.71%)	24(18.89%)

Table 3: Knowledge Attitude and Practice Score Based on Trainingof Healthcare Personnel in Secondary Care Hospitals.

Training	Yes	No
Knowledge		
Low(<10)	0(0%)	8(4.25%)
Medium(10-20)	115(40.78%)	142(75.53%)
High(>20)	167(59.21%)	38(20.21%)
Attitude		
Low(0-3)	0(0%)	9(3.19%)
Medium(4-6)	3(1.59%)	19(10.10%)

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Training	Yes	No
High(>6)	273(96.80%)	166(88.29%)
Practice		
Low(0-3)	9(3.19%)	24(12.76%)
Medium(4-6)	186(65.95%)	119(63.29%)
High(>6)	87(30.85%)	45(23.93%)

Discussion

In the present study, in both urban & rural hospital it was found that the high score (i.e. >20) was obtained more by doctors 60.91% in urban hospitals as compared to 54.28% in rural hospital followed by nursing staff, lab technicians and least in sanitary staff. This result was comparable to other studies like **Deo et al**[7] who found in their study among employees of a teaching Hospital in a rural hospital reported that knowledge regarding BWM was highest in Medical staff and least in non-medical staff. **Vishal et. al.**[8] reported that the overall awareness about BWM was highest among medical professionals.

In the present study, doctors in both urban & rural hospitals had mostly secured high secure high score in the field of knowledge (60.91%), attitude (80.45%) and practice (32.18%) while majority of technical staff & sanitary staff received score in median range (10-20). The results are comparable to other studies like **Rawat R et al**[9,] **Tabish SA et al**[10] etc.

In the present study, those who received training during past 6 months had high level of knowledge with a score of >20. Adequate knowledge is vital for appropriate BMWM practice. Training and good level of knowledge have been found to be associated in other studies as well like **Deress T et al**[11]**.**

In this study knowledge of biomedical waste management was more among those who were working less than 5 years as compared to those with more with 5-10 years of work experience. This might be due to recent training of them. This result was in contradiction to other studies like **charan & kaur et al** who found that awareness of Bio-medical waste increased as years of experience increased.

Conclusion

The study revealed that attitude towards Bio-medical waste management was good among healthcare personnel. Overall the knowledge and practice of Bio-medical waste management among healthcare personnel was satisfactory. Knowledge and attitude towards Bio-medical was better among Doctors & Nurses than the other cadre of staff. Good attitude can be translated into good practice if proper knowledge and skills are imparted to them via regular seminars, orientation and reorientation trainings.

Declarations

Funding: No funding was done

Conflict of interest: No conflict

Ethical approval: The study was approved by the Institutional Ethics Committee

References:

1. Mathur V, Dwivedi S, Mishra RP. Knowldege, attitude and practices of biomedical waste management among healthcare personnel: a cross-sectional study. Ind J of community Med. 2011;36(2):143-145.

2. Das SK, Sushant P, Jayaram K : A TQM approach to implementation of handling and management of hospital waste in Tata Main Hospital; Issued by Hospital Waste Management Committee, T.M.H. 2001;11 – 12 (1 – 2) :75 –78.

3. Palwankar PV, Singh A. Safety and measures for auxiliary staff associated with hospital waste disposal. Ind J of Waste Manage. 2004; 12(4):104-106.

4. Massrouje H.T.N. Medical waste and health workers in Gaza governorates. Eastern Mediterranean Health journal;7(6):1017-1024.

5. Gupta N.K., Shukla M, Tyagi S. Knowledge, attitude and practices of biomedical waste management among health care personnel in primary healthcare centres in Lucknow. Int J Comm Med Pub Health. 2016; 3(1):309- 13.

6. Kaliyaperumal K, Guideline for conducting a Knowledge, Attitude and Practice (KAP) Study. AECS illumination;4(1):7-9.

7. Deo D, Tak SR, Munde SS. Study of knowledge regarding biomedical waste management among employees of a tertiary hospital in rural area. Ind J IndianSoc Hosp Waste Manage. 2006;5(6):12-16.

8. Batham V, Likhar SK, Mahesh MK, Athavale AV, Agarwal S, Shukla US. Assessment of Knoweldge about Biomedical Waste Management amongst the hospital staff in Bhanupur, Bhopal. Nat J of Commun Med. 2012;3(2):197-200.

9. Kumar M, Singh RK, Rawat V. Awareness and practices about bio-medical waste among health workers in tertiary care hospital of Haldwani, Nainital. Nat J of Med Res. 2015;5(1):47-51.

10. Tabish SA, Amir SK, Sajad B. Assessment of Knowledge, Attitude and Practices of Biomedical Waste Management among Healthcare Personnel in Kashmir. Inter J of Scientific Res. 2018;7(5):926-929.

11. Deress T, Hassen F, Adane K, Tsegaye A. Assessment of knowledge, attitude and practice about Biomedical waste management and associated factors among the healthcare professionsals at Debre Markos Town Healthcare Facilities, Northwest Ethopia:cross-sectional study. J of environ public health, 2018.

The Impact of Covid -19 on Physical and Mental Health of Children: A Descriptive Study

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Abstract

Background and Aim: The World Health Organization (WHO) acknowledged coronavirus epidemic as a pandemic and declared the outbreak as a public health emergency of international concern. Emerging research has suggested that these various restrictions, as well as the fear of the virus itself, may have caused children to experience negative mental health consequences. Due to increased amounts of time spent at home the parents need to be aware about the changes in the mental and physical health of the children. This study, thus aimed to survey the effects of the COVID-19 pandemic lockdown on physical and mental health of school-going children.

Material and Methods: A cross sectional survey was designed to analyse the impact of COVID-19 on the physical and mental health of children. The data is collected with the use of online survey platform. A semi structured questionnaire was developed with several open and close ended questions to examine the effect of lockdown on the mental and physical health of the children from parent-reported changes. Any mental health issues and emotional problems newly emerged or aggravated during lockdown were also enlisted. Another objective was to determine the level of awareness amongst parents about the importance of PA for the child.

Results: A total of 200 children were included in the study. When the comparison was done in time from before and after lockdown, it was found that the hours spent on mobile were increased from 2 hours to 5 hours. There was significant decrease in the time spend for physical activity. A total of 65% of the respondents reported that there was change in the behaviour of the children. Around 58% of the children had shown the physical changes like eyestrain, fatigue, neck pain, head ache, lower back pain and major problem with increase in weight of children.

Conclusion: More research is needed to improve our understanding of the long-term impacts of the COVID-19 pandemic on children's mental health, especially with regards to the identification of protective factors found in children who may have been less affected by the pandemic.

Key Words: COVID-19, Mental health, Pandemic, World Health Organization.

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Introduction

The novel coronavirus, later designated as COVID-19, is an infectious disease that can spread among humans. It emerged initially in the city of Wuhan in China in late December 2019, when cases of pneumonia of unknown etiology were reported. The World Health Organization (WHO) acknowledged this coronavirus epidemic as a pandemic and declared the outbreak as a public health emergency of international concern. Most regions around the world are affected severely, including the United States, Brazil, India, Russia, and Europe, which have seen an increasing number of cases and deaths than the rest of the world.[1,2]

Subsequently, many countries imposed national lockdowns, closing schools and workplaces, leaving people to learn virtually, enforcing social distancing measures, and implementing restrictive measures that prevented individuals from going to public places or from meeting people from other households.[3] Emerging research has suggested that these various restrictions, as well as the fear of the virus itself, may have caused children to experience negative mental health consequences. In non-pandemic contexts, prevalence studies have shown that between 14 and 25% of children experience psychological distress.[3,4]

The mental health of millions of children worldwide has been put at risk, with at least one in seven forced to remain at home under nationwide public health orders – or recommendations – during the COVID-19 pandemic. More than 330 million youngsters have been stuck at home, till March 2021, for at least nine months, since the virus spread uncontrollably this time last year.[5,6]

It has become difficult for parents to calm their children's anxieties because of the uncertainty and stress in their own lives. The occupational or emotional challenges parents face is interfering with their usual ability to address their children's needs and worries. It is not unusual for children to experience negative emotions such as fear, disappointment, sadness, anxiety, anger, loss etc. But it is the prolonged, restrictive, and widespread nature of the COVID-19 pandemic that has exacerbated the situation. Increased screen time, strained family relations or sedentary lifestyle at home pose additional challenges.[3,7]

Due to increased amounts of time spent at home the parents need to be aware about the changes in the mental and physical health of the children. As the primary caregiver they will have a positive impact on the young minds. This study, thus aimed to survey the effects of the COVID-19 pandemic lockdown on physical and mental health of school-going children.

Materials and Methods

A cross sectional survey was designed to analyse the impact of COVID-19 on the physical and mental health of children. The data is collected with the use of online survey platform. Potential respondents were invited through social media platforms and after obtaining informed e-consent were directed to fill in a google-form. Participation in the study was voluntary and anonymous. Parents/legal guardians of children of the age group 5-12 years of either gender; able to speak and read English; and currently staying with their child were included.

Exclusion criteria was set as (a) refusal to participate in the study, (b) child with any congenital or acquired physical health problem or mental illness, or (c) parents themselves had any psychiatric or cognitive issues based on self-report. A non-randomized convenient sampling method was used to recruit the target population living in India. Sample size was not calculated before conducting the study, but maximum participation was desirable and anticipated owing to the current social relevance of this topic.

A semi structured questionnaire was developed with several open and close ended questions to examine the effect of lockdown on the mental and physical health of the children from parent-reported changes. PA characteristics were assessed using variables like the child's current level of PA; location of PA; and, the quantity and pattern of sleep; and use of digital devices. The rates of use of remote and streaming services for PA were also identified.

Any mental health issues and emotional problems newly emerged or aggravated during lockdown were also enlisted. Another objective was to determine the level of awareness amongst parents about the importance of PA for the child. From pre COVID-19 and during lock down periods

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parents reported observable changes in physical and emotional behaviour, which were then analysed.

Results

A total of 200 children were included in the study. The mean age of the included participants was 8.50 with the standard deviation of 3.22. The result of study showed there was significant increase in the number of hours spent on digital appliances. When the comparison was done in time from before and after lockdown, it was found that the hours spent on mobile were increased from 2 hours to 5 hours. The idly seating time increased from 1 to 2 hours to 5 – 6 hours and the sleeping time was also found to be increased from 7 to 8 hours to 10 hours nearly. There was significant decrease in the time spend for physical activity. It decreased from 3 hours to 1 hour daily. It was observed that 63% of the children do not participate in any online physical activity training.

It was observed that 79% of the involved children were engage in excessive amount of spending screen time. A total of 65% of the respondents reported that there was change in the behaviour of the children. The major changes in the behaviour of the children were laziness, irritation, impatience, excessive anger, anxiety, frustration, decreased attention span, hyperactivity and agitation.

There were physical changes noted in the children. Around 58% of the children had shown the physical changes like eyestrain, fatigue, neck pain, head ache, lower back pain and major problem with increase in weight of children. About 68% of the children were found with affected mental health.

By participating in this survey, the parents are now more observant and are sensitized about the increased amount of screen time by their children, be it online education or playing games or social media. While unanimously appreciating the need for physical activity for their children, some parents expressed the need for more information and guidance in this regard.

Table 1: Mean Age of the Study Participants

Variable	Mean	Standard Deviation
Age Group (Years)	8.50	3.22

Table 2: Comparison of Various Parameters before and after Lockdown

Variable	Before Lockdown	After Lockdown
Hours spent on mobile	2 Hours	5 Hours
Seating Time	1 to 2 Hours	5 to 6 Hours
Physical Activity	3 Hours	1 Hours

Discussion

Though lockdown measures were gradually lifted, **and some schools were allowed to reopen, children's regular** routines were disrupted with the addition of new rules, such as wearing a mask in class or making a transition to online or hybrid schooling (instead of in-person learning). Emerging research has suggested that these various restrictions, as well as the fear of the virus itself, may have caused children to experience negative mental health consequences. The unexpected disruption of the social fabric and norms has affected the behavioral and mental health of the public, including children. The mental health of children has been influenced by several ways, as this unprecedented situation changed a way they typically grow, learn, play, behave, interact, and manage emotions.[8,9]

Several studies in adults during the pandemic have found consistent associations between lower physical activity and poorer mental health and between higher daily screen time and poorer mental health, but association this has not been well studied in children.[10] Researchers have drawn on prepandemic studies to emphasize the potential mental health consequences of the pandemic and called for research and augmented mental health services. However, few studies have reported on the mental health of children during the pandemic and none, to our knowledge, have specifically examined the association of physical activity and screen time with mental health in nationally representative samples.[11]

Parents unanimously mentioned that school closure has been the major factor and has affected the physical activities of their child. Studies conducted prior to lockdown have identified that children are

engaged more in sedentary time and reduced levels of PA on weekends as compared to weekdays. Children tend to put-on weight during holidays, especially those who are not enrolled in recreational activities and summer camps.[11] It can be hypothesized that there may be vast repercussions on children's overall physical health during the prolonged lock down situation because of school closure lasting a year or more. With a rise in inactivity and disrupted sleep schedules/quality in children during the COVID-19 lockdown there have been disrupted behaviour across 24-hour day. In a national survey, only 4.8% of children were meeting combined movement behaviour guidelines during COVID-19 restrictions.[12]

Lastly, the survey respondents were mainly more highly educated parents with higher household income levels. Findings may not extend to children whose parents have not attained a college degree or who reside in lower income households. It will be useful for future research on the impact of COVID-19 on children's PA and sedentary behaviour to collect data from a more diverse sample and among lower income families.

Conclusion

More research is needed to improve our understanding of the long-term impacts of the COVID-19 pandemic on children's mental health, especially with regards to the identification of protective factors found in children who may have been less affected by the pandemic. Several questions remain unanswered including which characteristics of living environments can positively or negatively affect children's capacity to adapt to major public health crises such as the COVID-19 pandemic.

Ethical approval was taken from the institutional ethical committee and written

Informed consent was taken from all the participants.

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References

1. Harapan H, Itoh N, Yufika A, Winardi W, Keam S, Te H, Megawati D, Hayati Z, Wagner AL, Mudatsir M: Coronavirus disease 2019 (COVID-19): A literature review. Journal of infection and public health 2020, 13:667-73.

2. Alimolaie A: A review of coronavirus disease-2019 (COVID-19). Iranian Journal of Biology 2020, 3:152-7.

3. Panchal U, Salazar de Pablo G, Franco M, Moreno C, Parellada M, Arango C, Fusar-Poli P: The impact of COVID-19 lockdown on child and adolescent mental health: systematic review. European child & adolescent psychiatry 2021:1-27.

4. de Bruin YB, Lequarre A-S, McCourt J, Clevestig P, Pigazzani F, Jeddi MZ, Colosio C, Goulart M: Initial impacts of global risk mitigation measures taken during the combatting of the COVID-19 pandemic. Safety science 2020, 128:104773.

5. Schott W, Tao S, Shea L: COVID-19 risk: Adult Medicaid beneficiaries with autism, intellectual disability, and mental health conditions. Autism 2022, 26:975-87.

6. Cook MA, Brooke N: Event-based surveillance of poisonings and potentially hazardous exposures over 12 months of the COVID-19 pandemic. International journal of environmental research and public health 2021, 18:11133.

7. Singh S, Roy D, Sinha K, Parveen S, Sharma G, Joshi G: Impact of COVID-19 and lockdown on mental health of children and adolescents: A narrative review with recommendations. Psychiatry research 2020, 293:113429.

8. Pedrosa AL, Bitencourt L, Fróes ACF, Cazumbá MLB, Campos RGB, de Brito SBCS, Simões e Silva AC: Emotional, behavioral, and psychological impact of the COVID-19 pandemic. Frontiers in psychology 2020, 11:566212.

9. Shah K, Mann S, Singh R, Bangar R, Kulkarni R: Impact of COVID-19 on the Mental Health of Children and Adolescents. Cureus 2020, 12.

10. Twenge JM, Campbell WK: Associations between screen time and lower psychological well-being among children and adolescents: Evidence from a population-based study. Preventive medicine reports 2018, 12:271-83.

11. Smith L, Jacob L, Trott M, Yakkundi A, Butler L, Barnett Y, Armstrong NC, McDermott D, Schuch F, Meyer J: The association between screen time and mental health during COVID-19: a cross sectional study. Psychiatry research 2020, 292:113333.

12. Bates LC, Zieff G, Stanford K, Moore JB, Kerr ZY, Hanson ED, Barone Gibbs B, Kline CE, Stoner L: COVID-19 impact on behaviors across the 24-hour day in children and adolescents: physical activity, sedentary behavior, and sleep. Children 2020, 7:138.

Role of Computed Tomography of Paranasal in Nasal and Sinus Pathology

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Abstract

Background: Pathological lesions of the paranasal sinuses include a wide spectrum of Conditions ranging from inflammation to neoplasms both benign and malignant. Most patient of common cold present with symptoms of nasal discharge, nasal obstruction, headache and nasal allergy etc. The patient of paranasal mass usually present with facial deformity, swelling or repeated episodes of epistaxis.

Aim: The aim of the study was to establish the role of CT in evaluation of pathologies and their proper early diagnosis.

Materials and Methods: This is a prospective study, from may 2016 to september 2016, who attended the ENT department of AIMSR.

Statistical Analysis Used: SPSS.

Results: Out of 50 cases 51 (51%) cases were males and rest 49 (49%) patients were females. The majority of the cases were of age group 16-30 which were 37case (37%) The most common symptoms were nasal obstruction (50%), followed by nasal discharge (49%), headache in 20% cases. Most common anatomical variations seen was deviated nasal septum (49%) more commonly on right side next common was agger nasi in 48% of cases. Maxillary sinuses are most commonly involved in the study, followed by the ethmoid sinuses and frontal sinuses. The most common pathology seen was masses in 30% cases followed by DNS in 21% cases. The most common form of mucosal thickening noted is circumferential type seen in 7% cases. The most common pathology involving the sinuses was sinusitis (30%) followed by polyp (25%).

Keywords: CT-PNS, Rhinosinusitis, Sino-nasal diseases.

Introduction

Pathological lesions of the paranasal sinuses include a wide spectrum of Conditions ranging from inflammation to neoplasms both benign and malignant. Most patient of common cold present with symptoms of nasal discharge, nasal

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obstruction, headache and nasal allergy etc. The patient of paranasal mass usually present with facial deformity, swelling or repeated episodes of epistaxis. Preliminary investigation by standard sinus radiographs are sub optimal in displaying regional morphology of ostiomeatal area, Ethmoid & Sphenoid sinuses and anatomical variants. Further there is overlapping between these structures hence these are insufficient to diagnose and as a guide to endoscopic sinus surgery & modified PNS surgeries.

Computed Tomography (CT) has shown enormous development since the original CT images obtained by Hounsfield in early 1970. CT has been revolutionalised by utilizing differential contrast enhancement characteristics of lesion, a clear distinction between tumor mass and inflammatory tissue can be made out which is of utmost importance for treatment of patients. CT also plays role in diagnosing the complications and intracranial extension of sinonasal diseases.

The multifaceted benefits of CT in PNS over other imaging & diagnostic procedures are countless. The present study was conducted to establish the role of CT in evaluation of pathologies and their proper early diagnosis.

Materials and Methodology

This prospective study was done in the Department of otorhinolaryngology of AIMSR. A total of 50 patients who were referred to our department with clinical suspicion of PNS disease underwent CT evaluation of PNS using 64 Multi slice CT scanner from may 2016 to september 2016.

Observations and Results

The present study was conducted in a study population of 50 patients, who presented with clinical complaints of nasal obstruction, nasal discharge & positive ENT examination findings and underwent computed tomographic imaging. The computed tomographic imaging was then evaluated to identify the abnormalities in our study group.

Table 1: classification of cases on the basis of their Age & Sex

Age group	Male	Female	Total No. case	%
< 15	3	2	5	13%
16-30	11	7	18	37%
31-45	6	9	15	30%
46-60	5	4	9	15%
>60	2	1	3	5%
Total	27	23	50	100%

The majority of the cases were of age group 16-30 which were 18 case (37%), 15 case (30%) in age group 31-45 yrs, 9 cases (15%) in age group 46-60 yrs. 5 cases (13%) below 15 yrs. and 3 cases (5%) more than 60 yrs. age group.

Table 2: Classification of Cases on the Basis of their Presenting Complaints

Symptom	No. of Cases	%
Nasal Obstruction	25	50%
Nasal Discharge	24	49%
Headache	10	20%
Face Swelling	8	17%
Allergy	4	8%
Epistaxis	3	5%
Proptosis	2	4%
Loss of Vision	1	1%

The most common symptoms were Nasal obstruction (50%), followed by Nasal discharge (49%), headache in 20% cases.
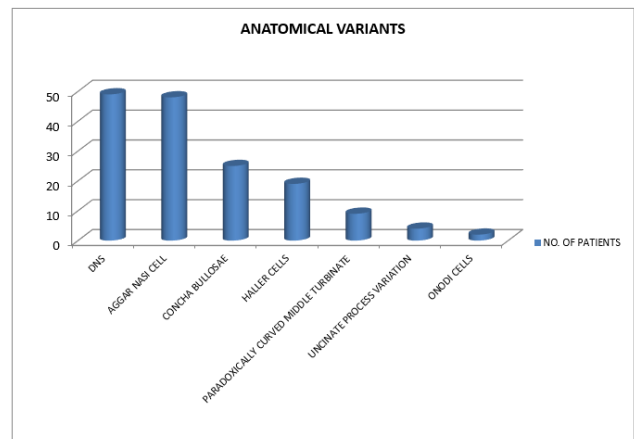
Fig 2: Classification of cases on the Basis of Anatomical Variants of PNS

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Most common anatomical variations seen was Deviated nasal septum (49%) more commonly on Rt. Side next common was agger nasi in 48% of cases.
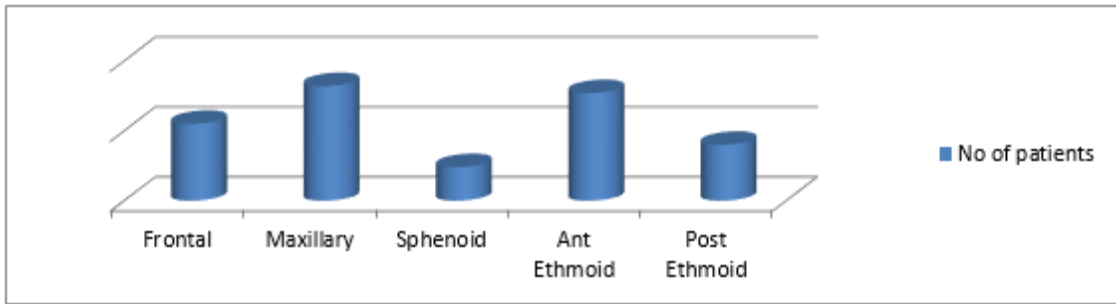
Fig 3: CT. Findings in Paranasal Pathologies

Maxillary sinuses are most commonly involved in the study(41 cases), followed by The ethmoid sinuses (ant.group 38cases, post group 20 case) and frontal sinus 27 cases.
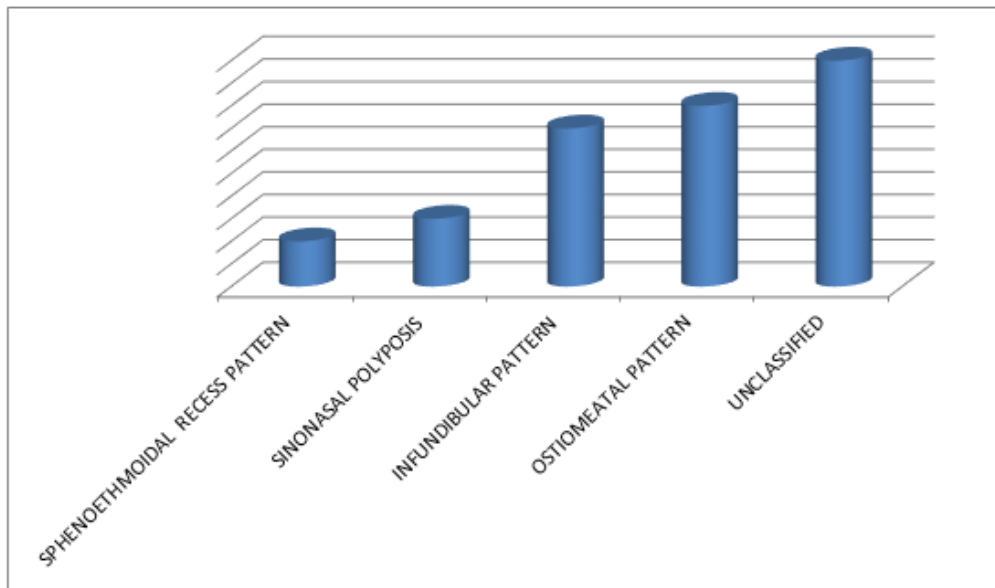
Fig 4: Classification of Cases on the Basis of Radiological Pattern Of Rhinosinusitis

The most common radiological pattern of sinus involvement is unclassified type seen in 33% of cases, followed by ostiomeatal pattern in 26%.

Fig 5: Classification of Cases on the Basis of Type of Pathology

The most common pathologies are sinonasal(51%) followed by sinus involvement in 38% cases.

The most common pathology seen was Masses in 30% cases followed by DNS in 21% cases.The most common form of mucosal thickening noted is circumferential type seen in 7% cases.

Cases are distributed on the basis of bony involvement.

The most common form of metastasis seen is soft tissue involvement (33%) followed by intracranial(22%) and infratemporal(22%) region.

The most common pathology involving sinonasal region is polyp(37%) followed by carcinoma(21%).

The most common Nasal pathology noted was Angiofibroma(28%) followed by carcinoma(18%).

The most common pathology involving the sinuses was Sinusitis(30%) followed by Polyp(25%).

Discussion

Computed Tomography plays an indispensable role in the detection and characterization of paranasal sinus pathologies. The characterisation of PNS lesions is of immense importance because the identifying abnormalities of PNS influence the clinical and surgical decision making. Our study was carried out in the department of Otorhinolaryngology and head and neck surgery,.It included 50 patients having PNS pathology who underwent CT. The majority of the cases in our study were of the age group 16 - 30 years(37%) followed by 31-45 years(30%), 46-60 years(15%) below 15yrs(13%) and age group above 60years(5%).

In our study, 51% of the cases were male while 49% were female with marginal preponderance for male which is in concordance with study conducted by **Nitin.V.D et al**[1] Patients presented with overlapping symptoms in most cases, of which the most common presenting complain being nasal obstruction(50%) followed by nasal discharge(49%), which is consistent with the study conducted by **Gautam.p. et al**[2]

In our study, the most common PNS pathology was sinusitis, it is classified as bacterial, viral, fungal; acute, or chronic sinusitis and based on region involved sinonasal or purely nasal or sinosal. In our study the most common pattern of involvement was sinonasal (51%) with maxillary sinus being the most common sinus involved (82%) followed by posterior ethmoidal(77%), which is consistent with the study done by **Bolger et al** [3] There are 5 basic pattern of mucosal involvement seen in patients of chronic sinusitis chronic sinusitis they are, Infundibular, Osteomeatal unit, Sphenoethmoidal recess, Sinonasal polyposis and Unclassified. Most common pattern in our study was unclassified (33%) followed by osteomeatal unit pattern(26%), infundibular pattern(24%), sinonasal polyposis(10%), sphenoethmoidal recess pattern(7%). The findings are consistent with the study done by **Naimi et al.** [4]

Mucocele is an expansile, cystic, hypo to isodense lesion with bony erosion and intraorbital extension with no contrast enhancement. In our study frontal sinus was the most common sinus involved(80%). 10% cases showed orbital extension and 20% showed bony erosion, this is consistent with study done by Beratriz peral et al. Diagnostic accuracy of mucocele in our study was 100% which is consistent with the study done by **Silberstein et al** [5]

Granulomatous disease is characterised by mucosal thickening, bony sclerosis and calcification. In our study 3 cases were diagnosed as granulomatous disease. 2 out of 3 were sinonasal and 1 was purely nasal. The diagnostic accuracy in our study is 100% which is in concordance with study done by **Bakshi j et al.**

Kaplan BA et al determine the diagnostic criteria and etiology of complete unilateral maxillary sinus opacification and found that unilateral maxillary sinus opacification is a relatively common finding. Early identification of inverting papillomas and mucoceles may avoid delay in surgical intervention, whereas acute/chronic rhinosinusitis and nasal polyposis can initially be managed medically. Careful history, endoscopic examination, and radiographic studies can often determine the responsible disease process. **K Dua et al** comment that CT Scan Paranasal sinuses has become mandatory for all patients undergoing functional endoscopic sinus surgery. It depicts the anatomical complexities of ostiomeatal complex in much simpler way and acts as a road map for endoscopic sinus surgery. Fifty patients of chronic sinusitis were evaluated by CT Scan PNS -coronal and axial views. The anatomical variations and changes in osteomeatal complex on CT Scanwere studied. In majority of patients, osteomeatal complex and anterior ethmoids were involved (88%).Agger nasi cells (40%) were the most common anatomical variations followed by concha bullosa and hallercells (16%). Apart from this deviated nasal septum was found in 44% of patient.

Sinus computed tomography (CT) is widely performed in the imaging workup of sinusitis, but it is sometimes criticized by the surgeons for its lack of specificity. There have been studies where Mucosal thickening of the paranasal sinus has been

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seen in up to 30% of the asymptomatic population. **Rak KMNewell et.al.** In addition to that, the mucosal thickening of sinuses has been reported in patients with nonspecific upper respiratory tract infection, such as the common cold and coryza. **Gwaltney Jr et.al.** there have been numerous reports in surgical journals that found sinus CT findings did not correlate well with a patient's clinical symptoms, since results of sinus CT can be normal for severely symptomatic patients and abnormal for patients with minimal symptoms. **Yoshimi Anzai. et.al.**

R Shwartz 2010 describe CT findings in primary nasal and nasopharyngeal rhinoscleroma include soft-tissue masses of variable sizes. The lesions are characteristically homogeneous and nonenhancing, and they have distinct edge definition. Adjacent fascial planes are not invaded. Findings also include calcifications, luminal stenosis, wall thickening, and nodules The diagnostic accuracy using above CT criteria for different lesions was assessed. The CT accuracy for inflammatory lesions in our study was 86%, for benign lesion was 90% and 80% for malignant lesions. Thus CT had a high accuracy, sensitivity and specificity for differentiating and characterisation of inflammatory, benign and malignant lesions of PNS.

Conclusion

The present study was undertaken to determine the role of CT in evaluation of PNS pathology and its potential role in differentiating benign from malignant lesion. 50 patients with complains of PNS pathology were imaged. The CT characteristics of pathology were evaluated. From the observations we concluded that Most of the patients with PNS pathology were from 2nd and 3rd decade. Slight male preponderance was noted. Majority of the patients presented with nasal obstruction. Most common anatomical variant seen was DNS. Most common sinus involved was maxillary. Sinonasal pathologies were the most common followed by pure nasal or pure sinosal. The most common pathology was inflammatory (74%). The most common benign pathologies were polyps with 92% accuracy. 15% of cases had malignancy with diagnostic accuracy of 90%. Computed Tomography has high accuracy, sensitivity and specificity for detection, characterisation and differentiation of inflammatory, benign and malignant lesions of PNS.

References

1. Nitin V. Deosthale, Bhanupratap Singh,et.al. "Effectiveness of Nasal Endoscopy and C.T. Scan of Nose and Paranasal Sinuses in Diagnosing Sino-Nasal Conditions". Journal of Evolution of Medical and Dental Sciences 2014; Vol. 3, Issue 14, April 07; Page: 3695-3703, DOI: 10.14260/jemds/2014/2346.

2. Gautam P, Modwal A, Saboo RA Comparative Study of CT scan PNS with nasal endoscopy findings in chronic rhino sinusitis patients. Transworld Medical Journal. 2014;2(1):14-17.

3. Bolger WE, Butzin CA, Parson DS. Paranasal sinus bony analysis for endoscopic sinus surgery. Laryngoscope 1991 Jan: 101-56-64.

4. Naimi m et al., the major obstructive inflammatory pattern of sinonasal disease in 200 candidates of FESS. IJR volume 17no 42.

5. Silberstein S. Headaches due to nasal and paranasal sinus disease. Neurol Clin. 2004;22:1–19. doi: 10.1016/S0733-8619(03)00091-4.

6. Carmeli G, Artzi Z, Kozlovsky A, Segev Y, Landsberg R. Antral computerized tomography pre-operative evaluation: Relationship between mucosal thickening and maxillary sinus function. Clin Oral Implants Res 2011;22:78-82.

Assessment of Pulmonary Function Test among Employees of Petrol Filling Stations

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Abstract

In the current scenario, the health-related issues at the workplace are steadily increasing. Amongst various factors, one of the reasons for the atmospheric pollution to be raised, is an increase in the number of vehicles, as there is a marked trend towards urbanization. Health effects of occupational exposure to gasoline and air pollution from vehicular sources are relatively unexplored among petrol filling station workers. The objectives of the present study were to (1) assess the vital parameters among employees of petrol filling stations. (2) assess the pulmonary function test among employees of petrol filling stations. A total of 40 employees from selected petrol filling stations at New Delhi have participated in the study. Highest 40% of employees had more than 2 years of exposure. Regarding type of work, majority (74%) were service station attendants and least (8%) were managers. Highest percentage of employees (88%) worked for more than 5 days in a week. Similarly, highest percentage employees (80%) worked 8hours in a day and 48 hours per week. The results revealed normal vital organ function and longer the occupational exposure, the higher the incidence of respiratory morbidity among the employees. The reasons behind this increase are not using personal protective equipment and occupational exposure.

Key words: Pulmonary function test, Petrol filling station employees, pulmonary function, occupational exposure

Introduction

Occupational health is an area of work in public health to promote and maintain highest degree of physical, mental and social well-being of workers in all occupations. Occupational health is a field of healthcare that is concerned with the relation between work and health. It aims to protect and improve the health and welfare of employees in their respective workplaces.

Occupational health seeks to promote and maintain the health and wellbeing of employees, with the aim of ensuring a positive relationship between an employee's work and health. Having access to specialist occupational health practitioners is key to unlocking the benefits for employees and organisations[2].

If global health entails a wider approach of public health at the international level, occupational global

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health focuses on prevention of illnesses and injuries in the workplace under a worldwide perspective. The global implications of occupational health and safety (OHS) are directly related to the internationalized dynamics of the global economy. Given the tight connection of global occupational health with global economics, multidisciplinary expertise is needed to understand the links between economic development and the potential effects on the health and safety of workers[4].

Current Challenges in Global Occupational Health

Occupational health and safety should have higher priority on the international agenda, but improvement of OHS infrastructures and systematic preventive approaches in industrializing countries are extremely slow. Although many countries have developed laws and enforcement activities, working conditions for the majority of the world's workers do not meet the minimum standards and guidelines set by the World Health Organization (WHO) and the International Labour Organization (ILO). Occupational health and safety regulations cover only about 10% of the population in developing countries[9].

Only 5% to 10% of workers in developing countries and 20% to 50% of those in industrialized countries have access to adequate occupational health services[4].

The World Health Assembly urges countries to

- develop national policies and action plans and to build institutional capacities on occupational health,

- scale up the coverage with essential interventions for prevention and control of occupational and work-related diseases and injuries and occupational health services

- ensure in collaboration with other relevant national health programmes such as those dealing with communicable and non-communicable diseases, prevention of injuries, health promotion, mental health, environmental health, and health systems development.

According to WHO Overview on Occupational Health (2020)

The comprehensive global assessment provides insights on the health impacts that could be avoided through healthier and safer workplaces. It is estimated that 2.1% of all deaths and 2.7% of the disease burden worldwide can be attributed to quantified occupational risks. These and the effects from many more unquantified risks are outlined[9].

Noncommunicable diseases contribute 70% to the total disease burden from occupational risks, with chronic pulmonary disease and cancers causing the highest work-related death toll and disease burden. Workers in low- and middle-income countries bear the largest share of deaths and disability from workplace exposure[3].

The report also clearly identifies that prevention strategies are available to avoid a significant percentage of work-related deaths and of the disease burden. Implementing such strategies is important in an effort to attain the Sustainable Development Goals. Targeted action towards healthier and safer workplaces will contribute to sustainably improving and protecting the lives of millions around the world[9].

Spirometry in Occupational Health

The history of spirometry starts almost 200 years ago with James Hutchinson, who developed the spirometer "*with a view of establishing a precise and easy method of detecting disease*"[3].

Spirometry, the most common type of pulmonary function test (PFT), is used to evaluate worker respiratory health in medical surveillance programs and to screen workers for their ability to perform certain tasks. Spirometry, the most frequently performed pulmonary function test (PFT), is the cornerstone of occupational respiratory evaluation programs. In the occupational health setting, spirometry plays a critical role in the primary, secondary, and tertiary prevention of workplace-related lung disease[7].

In occupational health field, spirometry is still widely used to screen workers for their ability to perform certain tasks or efforts, and to evaluate workers' respiratory health in medical surveillance programs. Therefore, spirometry results can play a central role after hiring, in decisions about worker job assignments, in use, choice and efficacy assessment of personal protective equipment (PPE), and also in the assessment of exposure-related health effects[7].

What is more, a recent milestone article reported that occupational exposure is a potential cause of

almost all respiratory diseases. In fact, workplace exposures contribute substantially to the burden of multiple chronic respiratory diseases, including asthma (16%), chronic obstructive pulmonary disease (14%), chronic bronchitis (13%), idiopathic pulmonary fibrosis (26%), hypersensitivity pneumonitis (19%), other granulomatous diseases, including sarcoidosis (30%), pulmonary alveolar proteinosis (29%), tuberculosis (2.3% in silica-exposed workers and 1% in healthcare workers), and community-acquired pneumonia in working-age adults (10%)[1].

Occupational health spirometry testing is an exceptional, non-invasive, and highly effective method of monitoring the lung capacity and wellness of employees[10]. Hence the early recognition of respiratory health by modern devices (Spirometry) is an important task and to follow preventive measures of susceptible workers with respiratory morbidity need to adapt health promoting behavior in the work place before the chronic impairment develops will prove to be beneficial.

Aims and Objectives

The current study was aimed to find the pulmonary functional status of employees working in petrol filling stations. The objectives of the present study were to (1) assess the vital parameters among employees of petrol filling stations (2) assess the pulmonary function test among employees of petrol filling stations at New Delhi.

Material and Methods

A total of 40 petrol filling station employees were selected from petrol filling stations at New Delhi. Institutional Ethical Committee obtained from Vardhman Mahavir Medical College and Safdarjung Hospital, New Delhi. Purposive sampling technique was used to select the subjects. The study was conducted during November 2020 after obtaining the informed consent from the participant and competent authority approval taken from Director of Hindustan Petroleum Ltd, Bharat Petroleum Ltd and Indian Oil Corporation Ltd. In this study vital parameters were assessed by using pre calibrated Infra-Red Thermometer for temperature, Digital Sphygmomanometer for Blood Pressure, Pulse-oxy meter for oxygen saturation and pulse rate, Spirometry for respiration rate. The lung function parameters were assessed by using pre calibrated Spirometer (SPW10 Portable) to find out the pulmonary function test among petrol filling station employees. The researcher used questionnaire to collect basic socio demographic data and occupational data from the petrol filling station employees. The reliability of the tool was 0.90.

Discussion and Result
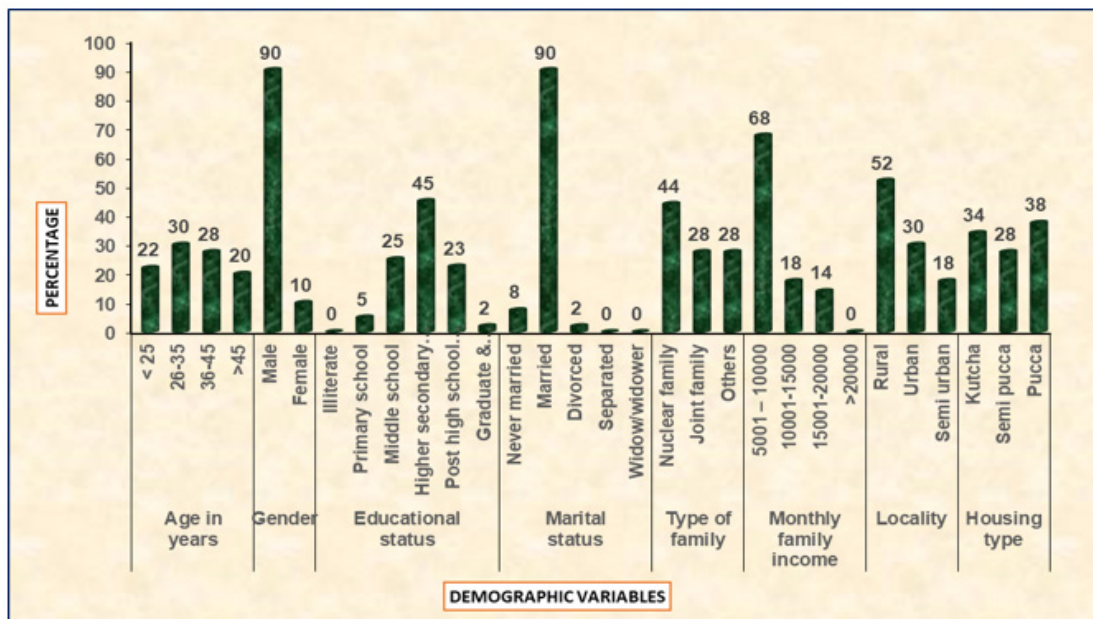
Figure 1. Demographic variables of employees of petrol filling stations

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The demographic data shows that highest (30%) of employee belonged to the age group of 26 to 35 years, 28% belonged to 36-45 years of age group and least (20%) belonged to >45 years of age group. Majority (90%) were males and 45% had higher secondary education. Majority 90% were married and 44% were from nuclear family. Regarding monthly income, the majority 68% of employees earned Rs. 5001-10000 and 52% of employees were from rural area, and more than half, 58% of the employees lived in pucca house.
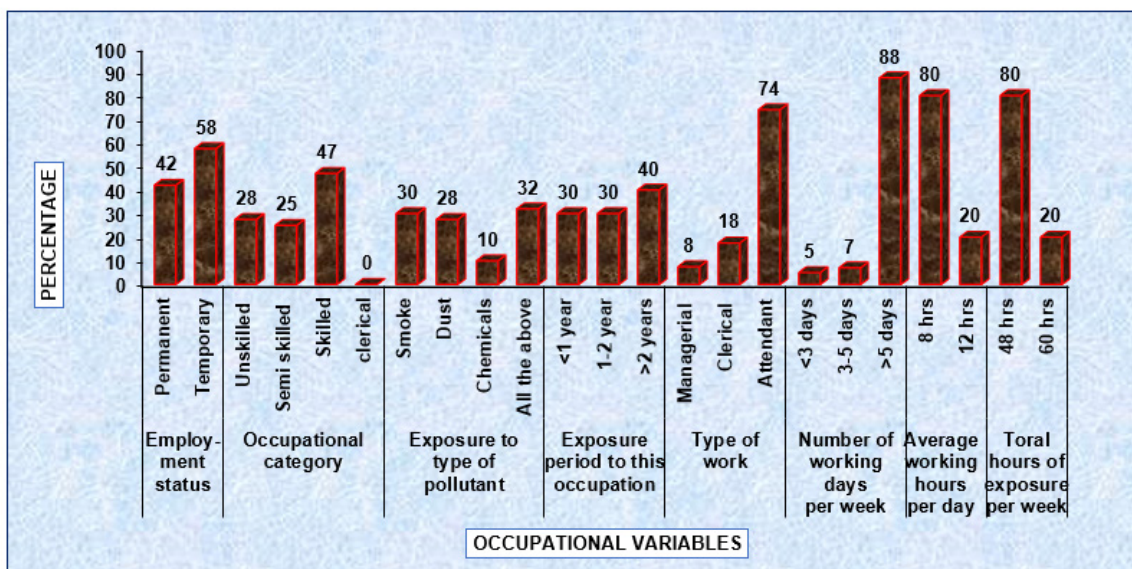
Figure 2: Occupational variables of employees of petrol filling stations

Occupational variables illustrate that, 58% of them were temporary employees and 47% were skilled workers. Regarding the type of pollutant exposure, 32% had exposure to smoke, dust and chemicals whereas, 30% had exposure to only smoke, 28% had dust exposure, and 10% had chemical exposure. About 40% of employees had more than 2 years of exposure. Regarding type of work, majority (74%) were service station attendant and least 8% were managers. Highest (88%) of employees work for more than 5 days in a week. Similarly, majority (80%) of employees work 8 hours in a day and 48 hours per week (Figure:1).

Table 1: Mean vital parameters among employees of petrol filling stations

N = 40

Assessment	Vital Parameters		
	Mean	**SD**	**Reference Values**
Pulse rate	83.15	9.571	60 – 100 beats per minute
Respiratory rate	16.25	2.404	12 – 16 breaths per minute
Systolic BP	128.47	14.107	90mmHg to 120mmHg
Diastolic BP	84.52	9.860	60mmHg to 80mmHg
SPO_2	96.32	2.673	95% - 100%

Table 1. shows the mean value of Vital parameters with the reference range values. The mean value of vital parameters among employees of petrol filling station showed an increased values when compared to normal reference level. The comparison concludes that majority of the employees had an abnormal level of vital parameters. Hence there is an urgent need for health interventions among petrol filling station employees, to bring their vital parameters to normal functional levels.

Table 2: Mean pulmonary function parameters among employees of petrol filling stations N = 40

Pulmonary Function Parameters	Comparison of mean value with Reference Values		
	Mean	SD	Reference Values
FVC (L)	1.565	0.765	Male 4.75 to 5.5 litres
	1.245		Female 3.25 to 3.75 litres
FEV1 (L)	2.344	0.853	Male 3.5 to 4.5 litres
	1.894		Female 2.5 to 3.25 litres
FEV1/ FVC (%)	50%	0.215	$\leq$ 70%
PEFR (L/S)	500L	92.474	Male 450 to 550 L
	296L		Female 320 to 470 L

Table 2 shows the pulmonary function parameters of petrol filling station employees. In comparison of mean spirometry value with reference Spirometry value, indicates that all pulmonary function parameters were abnormal. The average mean value of pulmonary function parameter was in low range compared to the normal reference range. The table indicates that majority of the employees had abnormal pulmonary function parameters, hence they need some kind of health care intervention.

Conclusion

Most of the petrol filling station employees had exposure to dust, fumes and chemicals. Hence early recognition of respiratory morbidity is important to take necessary steps to prevent respiratory morbidity in vulnerable groups, who are exposed to the risk-full environment. Long term exposure to the fumes causes severe respiratory morbidity. The findings revealed that Spirometry can be widely used to find out the pulmonary functional status of the employees working in petrol filling stations. Spirometry is a boon in occupational health in terms of cost effectiveness and easy to use and feasible means to identify respiratory morbidity in large scale studies.

References

1. Blanc PD, Annesi-maesano I, Balmes JR, et al. The Occupational Burden of Nonmalignant Respiratory Diseases an Official American Thoracic Society and European Respiratory Society Statement. American Journal of Thoracic Society. 2019; 199(11):1312-1334.

2. Griswold D. The Blessings and Challenges of Globalisation, Cato Institut. 2000; Washington DC. Google Scholar

3. Hutchinson J. On the Capacity of the Lungs, and on the Respiratory Functions, with a View of Establishing a Precise and Easy Method of Detecting Disease by the Spirometer. Journal of Respiratory society and Medicine. 1846; 29(1):137–252. doi: 10.1177/095952874602900113

4. LaDou J. Occupational health. International Journal Hygiene and Environmental Healt. 2013; 206: 303-313. Google Scholar

5. Piketty.T. Capital in the Twenty-First Century. Belk nap Press of Harvard University Press. 2014; Google Scholar

6. Roberto.G Lucchini and Leslie London. Annals of Global Occupational Health. Current Challenges and the need for Urgent Action. 2014; School of Medicine at Mount Sinai. 2014; 80: 251-256.

7. Townsend, Mary C. DrPH. Journal of Occupational and Environmental Medicine. 2020; 62(5), 208-e230, doi: 10.1097/JOM.0000000000001851

8. WHO Report. Preventing disease through a healthier and safer workplace. Department of Public Health. Environmental and social determinants of health. 2021 WHO (world health organization); http://www.who.int/phe

9. WHO.org.in

10. Occupational Health Organisation.org.in

Assessment of Hand Hygiene Practices and Barriers to hand Hygiene among Healthcare workers of Government Medical College Hospital Jammu

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Abstract

Introduction: Hand hygiene is most effective interventions to reduce spread of pathogens and prevent Hospital Acquired Infections (HIAs). Compliance of healthcare workers with hand hygiene practices is vital in preventing transmission of HIAs.

Aims: To assess practices and barriers of hand hygiene among healthcare workers of GMCH Jammu.

Methodology: Cross sectional study was conducted among healthcare workers of Government Medical College Hospital Jammu. Simple random sampling was used to interview 250 participants. Data was collected using pretested, validated and semi structured questionnaire. Details like products used for hand hygiene, moments of hand hygiene, barriers to hand hygiene practices and knowledge about hand hygiene were asked. Appropriate statistical tests were applied

Results: Out of 250 healthcare workers majority were using soap and water 203(81%) and alcohol based sanitizers 202(80%).Majority 234(93.6%) were always performing hand hygiene after touching blood, body fluids and secretions,222(88.8%) and after contact with the patients but only 138(55.2%) were following hand hygiene practices while switching from one patient to other.Most common barrier to wash hands was lack of soap/water115(46%) and inconvenient location of sinks 112(44.8%). Only 117(46.8%) were following six steps of hand wash. The association between designation of health care worker and steps of handwashing was found to be statistical significant.

Conclusion: Observed compliance to hand hygiene practices is low. There is lack of knowledge to perform six steps of hand washing and lack of facilities to maintain hand hygiene.

Key words: healthcare worker, hand-hygiene practices, compliance

Introduction

The provision of healthcare services is associated with potential range of safety problems. Despite the advances in healthcare globally, patients always remain susceptible to unintended adverse events in hospitals. Hospital acquired infection (HAI) can

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endangers the health of patients, healthcare workers and community members[1].

As per World Health Organization, prevalence of hospital acquired infections is about 5-10% in developed countries and roughly 40% in the developing countries[2]. Hand hygiene is a key tool for interrupting infection transmission in the health care environment. Washing hands with soap and water or using alcohol-based hand rub are considered the most effective methods for preventing the transmission of infectious diseases[3]. Maintaining proper hand hygiene is a single most cost-effective and practical measure to reduce the incidence of HAI. Thus it can prevent the spread of antimicrobial resistance across from tertiary care hospital to primary healthcare centres[4]. Adequate hand hygiene among hospital personal could prevent an estimated 15 to 30% of the HAI[1].

Lack of knowledge and lack of recognition of hand hygiene opportunities during patient care are mainly responsible for poor hand hygiene among HCWs. Although many countries have guidelines regarding hand hygiene for healthcare settings, overall compliance among HCWs remains poor [5,6] despite hand hygiene being regarded as one of the most important elements of infection control activities[7].

The World Health Organization (WHO) has developed the "My 5 Moments for Hand Hygiene" approach as key to protect the patients by improving hand hygiene and prevent the spread of pathogens, reducing HAIs. That approach encourages HCWs to clean their hands: before touching a patient, before clean/aseptic procedures, after body fluid exposure/risk, after touching a patient and after touching patient surroundings[8].

Factors like lack of knowledge and interest, time constraints, skin irritation, understaffing, hand irritation, inaccessibility or shortage of handwashing equipment, dense working conditions and poor knowledge are some of the reasons for following proper hand hygiene among health care workers [9]. The importance of hand hygiene is not sufficiently recognized by health care workers and poor compliance has been documented repeatedly [10.]

It is essential to explore knowledge practice gap about hand hygiene for effective infection control measures in health care settings. Still there is deficiency of research related to this topic in India even when the prevalence of HAI is high in the whole of Asia [11], J & K being no exception. Thus to improve Health Care Workers compliance with health Hygiene, it is therefore necessary to find out hindering factors and attempt to improve them. Keeping this in mind, the study was conducted to assess practices and find out barriers to hand hygiene practices among healthcare workers of Government Medical College Hospital Jammu.

Methodology

This cross sectional study was done in Government Medical College Hospital Jammu a teaching hospital in Jammu, India from June to August 2020. Jammu is the winter capital of Jammu & Kashmir and GMCH hospital provides tertiary health care for residents of Jammu as well as patients referred from other districts in vicinity. Study subjects included healthcare workers like resident doctors. interns,nurses,lab technicians etc. working in different departments.

The sample size was calculated using similar study result on knowledge on hand hygiene with the prevalence of 23%, 5% allowable error at 95% confidence which came out to be 283.Due to time constrain 250 participants from different departments of GMC Jammu were included in the study [12].

Ethical approval for this study was provided by the Institutional Ethical Committee GMC Jammu with number C-124. The investigator visited the participants in hospital wards and explained the nature of the study. Informed consent was taken from every participant. Simple random technique using lottery method.A pretested self structured close ended questionnaire was administered to participants asking demographic information and details about knowledge, attitude and practice about hand hygiene such as products used for hand hygiene, moments of hand hygiene, barriers to hand hygiene practices, knowledge about hand hygiene, and methods of hand drying.

For question analysis, Likert type of grading

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was used for the answer of strongly agree, agree, neutral, disagree and strongly disagree. Data was entered in IBM SPSS version 21 for Windows (IBM Inc. Armonk, New York, USA) and summarized by using descriptive statistics. A Chi square test was employed to test the association between knowledge and practice of hand hygiene with selected variables of interest. A P value of <0.05 was considered as statistically significant.

Participants who refused to participate in the study and who could not be contacted even after three consecutive visits in the respective work place were excluded from study.

Results

This study was conducted among two hundred two hundred fifty (250) health workers working in a Government tertiary care hospital. The mean age of the participants was 30.88 ± 8.15 years, more than half 168 (67.2%) were female, 166(66.4%) were of age group 20 to 30 years and 140(56%) were resident doctors.

Majority of healthcare workers i.e. 203(81%) were using soap and water and alcohol based sanitizers 202(80%),followed by liquid hand wash 143(57.2%) and chlorhexidine 19(7.6%).
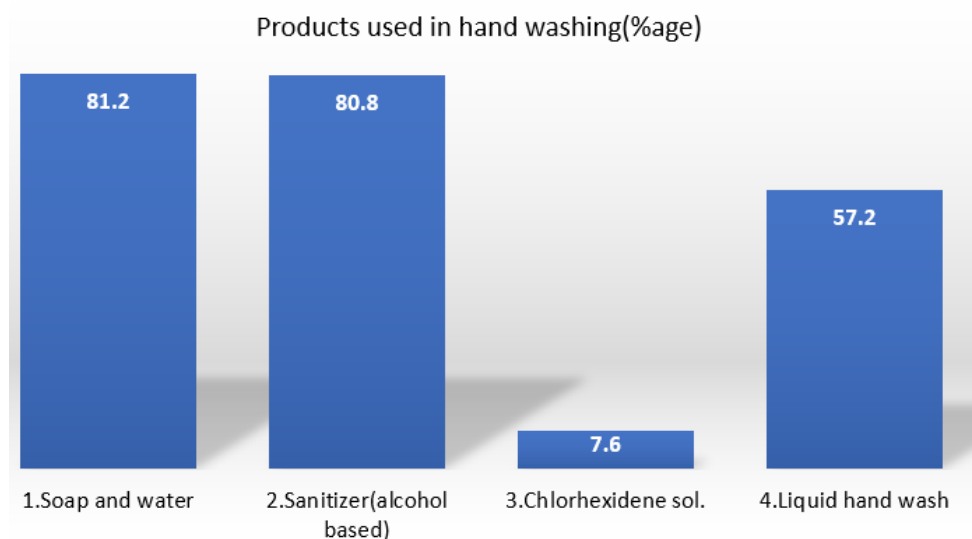
Fig 1: Figure showing the percentage of participants using various products for hand washing

In our study majority participants 234(93.6%) always perform hand hygiene after touching blood, body fluids and secretions,222(88.8%) after contact with the patients, after performing procedures(92%)

after day's work(91.6%) but only 138(55.2%) always follow hand hygiene practices while switching from one patient to other as shown in Table 1.

Table 1: Table depicting the distribution of moments of hand hygiene among participants.

Moments of hand hygiene	Occasional n(%)	Frequent n(%)	Always n(%)
1. Immediately on arrival at work	54 (21.6)	69 (27.8)	127(50.8)
2. Before putting on gloves	90 (36.0)	48(19.2)	112(44.8)
3. After removing gloves	24 (9.6)	40(16.0)	186(74.4)
4. After touching blood, body fluids/secretions	4 (1.6)	12(4.8)	234(93.6)
5. Before contact with patients	50 (20)	64(25)	136(54.4)
6. After contact with patients	5 (2.0)	23(9.2)	222(88.8)
7. Between patients	34 (13.6)	78(31.2)	138(55.2)
8. Before performing a procedure	16 (6.4)	31(12.4)	203(81.2)
9.After performing a procedure	5 (2.4)	14(5.6)	230(92.0)
10.After day's work	4 (1.3)	18(7.2)	228(91.6)

The most common barriers to compliance with hand hygiene reported by the respondent was lack of water and soap (62.4%) followed by inconvenient sinks (44.8%). Only 117(46.8%) were following the six steps of hand wash.

Table 2: Barriers to compliance with hand hygiene practices among the respondents(multiple answers)

Barriers to compliance with hand hygiene practices among health care workers	Frequency	Percent (%)
Lack of soap and water	115	62.4
Sinks are inconveniently located	112	44.8
Lack of water	94	37.6
Always wearing gloves during working hours	70	28.0
No place for hand wash	69	27.6
Too busy in work	68	27.2
Non availability of alcohol hand rub	57	22.8
Understaff	51	20.4
Hand washing agents causes irritation	42	16.8
Patient's needs take priority	32	12.8
I easily forgot to wash hands	17	6.8
Low risk of infection	15	6.0
Lack of knowledge	13	5.2

Table 3: Table showing association of socio demographic variables of participants with how often they follow 6 steps of handwashing

Variable	Steps of handwashing			p value
	Always	Frequent	Occasional	
1. Age				
a) 20-30	83	15	68	0.207
b) 31-40	26	8	23	
c) 41-50	5	3	10	
d) 51-60	3	3	3	
2. Gender				
a) Male	35	8	39	0.398
b) Female	82	21	65	
3. Designation				
a) Resident doctors	71	7	62	<0.001
b) Interns	31	2	12	
c) Laboratory technician	7	2	3	
d) Nursing orderly	3	9	7	
e) Female nursing staff	2	5	5	
f) HDU staff	2	4	15	

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Discussion

This study was done among 250 healthcare workers to assess practices and barriers of hand hygiene among them. The mean age of the participants was 30 years with majority of participants of age group 20 to 30 years(66.4%).In a similar study done in Ethiopia mean age of healthcare workers participating was 30 years and the majority of them were between the ages of 20 and 34 years [13]. Similar findings were also reported in studies done in Nigeria and Ghana [14,15,16]. The main reason behind majority of study participants being young population is that majority of the study participants are newly recruited with average of five years doing service in facility.

In our study, majority of the participants (93.6%)always perform hand hygiene after touching blood, body fluids and secretions, after performing procedures(92%) and after day's work(91.6%). In similar study done in Ethopia, hand washing practice after touching blood, body fluids, secretions was 100% [13]. This is comparable with the findings of Kingston [17]. This shows that health workers were primarily concerned with protecting themselves from acquiring pathogenic organisms from their patients; rather than trying to prevent the occurrence and spread of nosocomial infections amongst patients admitted under their care.

Most of participants i.e 81.2% were using soap and water for hand washing, The result showed that it is more than study done in Afar (72.53%)[18] but less than study done in Bahir Dar City (98%) [19]. In this study 80.1% of the participants used alcohol base sanitizer, which is in turn higher than study conducted at Bahir Dar City (2%) [19] and in Afar (27.47%) [18].

The most common barriers to compliance with hand hygiene reported by respondents were lack of water and soap (62.4%) followed by inconvenient sinks (44.8%). Similar findings are reported in another study where lack of water and soap was major constraints against washing hands which was seen among 122 (73.49%) HCWs [13].Same findings were reported in a study done in Uttarakhand India, which reported that 85.21% HCWs feels that hand hygiene facility are not conveniently placed and 80.87% of HCWs said that because of overburden of patient care, hand hygiene practices is not followed

[1.] Present study findings are also in line with study conducted by Segum B et al revealed that 66.8% of health care workers believed that there is inadequate facility for hand hygiene practices [20].

In our study 20.4% respondents said understaffing/ overcrowding or insufficient time, leads to poor adherence to hand hygiene practices which is low if compared with results of study done in Uttrakhand which reported that 81.73% of HCWs felt that understaffing/ overcrowding or insufficient time, leads to poor adherence to hand hygiene practices [1]. In this study 22.8% of health care workers felt non availability of alcohol hand rub as a barrier to complete hand hygiene practices. Literature also reported that availability of hand rub solutions at bedside patient intend to increase in adherence to hand hygiene practices[21].

Only 117(46.8%) participants were following the six steps of hand wash.This can be compared to results in a similar study done on undergraduate and junior doctors in Imphal where only 43.5% of the postgraduate students (43.5%) and 17.9% MBBS students follow the six steps of hand washing always [22.].This is in contrast to the finding of Chakraborty T et al. where a majority (80.8%) of the participants followed the six steps of hand washing always [23]. This may be because the participants might not be aware of the importance of the six steps of hand washing or might take it to be time consuming.

Our study reported that the professional status of the healthcare worker was significantly associated with hand hygiene knowledge score (P= 0.005). this can be compared to study done in teaching hospital of Ghana[16] where professional status of the healthcare worker was also significantly associated with hand hygiene knowledge score. In other study also it was noticed better hand hygiene compliance among healthcare workers working in Paediatrics and Medicine departments as compared to those involved in surgical and intensive care units [16].

Conclusion

Observed compliance to hand hygiene practices among studied Health Care Workers was low overall. The main barriers identified by respondents were lack of resources for maintaining proper hand

hygiene. The professional status of the healthcare worker was significantly associated with following six steps of hand washing.

Limitations: The main limitation of the current study is that results are based on self-reported questionnaire. There may be an exaggeration of hand hygiene compliance among participants. Another limitation of the study is that no proxy measures like hospital acquired infection rates of different departments, and access to hand hygiene facilities were not assessed in study to validate the self-reported hand hygiene practice.

Recommendation: There is need to educate and demonstrate to healthcare workers of steps of handwashing which can be done by regular seminars. Necessary steps need to be taken to provide proper place and supplies for hand washing.Written guidelines should be posted in well-known places to serve as a constant reminder.

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References

1. Kumar R, Gupta PK, Sharma P et al. Hand hygiene, attitude and barriers among health care workers at a tertiary care teaching hospital, Uttarakhand. Int J Health Sci Res. 2017; 7(9):159-165.

2. WHO Guidelines on Hand Hygiene in Health Care: First Global Patient Safety Challenge Clean Care Is Safer Care. Geneva: World Health Organization; 2009. Available from: https://www.ncbi.nlm.nih.gov/books/NBK144023(Last accessed on 2022 Mar 30)

3. Zakeri H, Ahmadi F, Rafeemanesh E, Saleh L. The knowledge of hand hygiene among the healthcare workers of two teaching hospitals in Mashhad. Electronic Physician. 2017; 9(8):5159-5165.

4. Ott M, French R. 'Hand hygiene compliance among healthcare staff and student nurses in a mental health setting. Mental Health Nursing. 2009; 30: 702- 4.

5. Wendt C. Hand hygiene-comparison of international recommendations. J Hosp Infect. 2001;S(A):23–8.

6. Suchitra J.B., Lakshmidevi N. Hand washing compliance – is it a reality? Online J Health Allied SCs. 2006;4:2.

7. Mathur P. Hand hygiene: back to basics of infection control. Indian J Med Res. 2011;134:611–620.

8. Sax H, Allegranzi B, Uçkay I, Larson E, Boyce J, Pittet D. 'My five moments for hand hygiene': A usercentred design approach to understand, train, monitor and report hand hygiene. J Hosp Infect 2007;67:921.

9. WHO. Risk Factors Influencing Children,s Healthy Environment in Kaplamai Division Trans-Nzoia District. Baseline Survey Report. Geneva : WHO; 2010.

10. Mathai E, Allegranzi B, Kilpatrick C, Pittet D. Prevention and control of health care-associated infections through improved hand hygiene. Indian J Med Microbiol. 2010; 28(2):100-106.

11. Nair SS, Hanumantappa R, Hiremath SG, Siraj MA, Raghunath P. Knowledge, Attitude,and Practice of Hand Hygiene among Medical and Nursing Students at a Tertiary Health Care Centre inRaichur, India. ISRN Preventive Medicine 2014,1-4.

12. Tyagi M, Hanson C, Schellenberg J, Chamarty S, Singh S. Hand hygiene in hospitals: an observational study in hospitals from two southern states of India. BMC public health. 2018 Dec;18(1):1-9.

13. Jamie AH (2020) Hand Washing Practices among Health Care Workers in Jugal Hospital, Harar, Ethiopia, 2020: In the Era of Corona Virus: Observational Study. J Antivir Antiretrovir.12:197.

14. Ango U, Kehinde J. Awosan K. Knowledge, attitude and practice of hand hygiene among healthcare providers in semi-urban communities of Sokoto state, Nigeria. Int J Trop Dis Health. 2017; 26(2):1-9.

15. Ekwere T, Okafor I. Hand hygiene knowledge and practices among health care providers in a tertiary hospital, Southwest Nigeria. Int J Infect Control. 2011; 9(4):1-10.

16. Amissah I, Salia S, Craymah J. A study to assess hand hygiene knowledge and practice among health care workers in a teaching hospital in Ghana. Intl J Sci Res. 2006; 5(8):301-307

17. Kingston LM, Slevin BL, O'Connell NH, Dunne CP. Attitudes and practices of Irish hospital based physicians towards hand hygiene and hand rubbing using alcohol based hand rub: A comparison between 2007 and 2015. J Hosp Infect. 2017; 97:17-25.

18. Jemal S. Knowledge and practices of hand washing among health professionals in Dubti referral hospital, Dubti, Afar, North-East Ethiopia. 2018; 1-7.

Jyoti Bala, Deepika Dewan, Rakesh Bahl et al. / Assessment of Hand Hygiene Practices and Barriers
to hand Hygiene among Healthcare workers of Government Medical College Hospital Jammu

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19. Gulilat K, Tiruneh G. Assessment of knowledge, attitude and practice of health care workers on infection prevention in health institution Bahirdar city administration. Sci J Public Health. 2(5): 384-393

20. Segun B, Emmanuel E, O Enembe O. A hand washing practice among health providers in a teaching hospital in southern Nigeria. Int J Infect Control. 2013:1-7.

21. Ariyaratne MHJD, Gunasekara TDCP, Weerasekara MM, et al. Knowledge, attitude and practices of hand hygiene among final year medical and nursing students at the University of Sri Jayewardenepura. Sri Lankan Journal of Infectious Diseases. 2013;3(1):15-25.

22. Dutta G, Singh TG, Kumar T. Knowledge and practice of hand hygiene among undergraduate students and junior doctors in the Regional Institute of Medical Sciences, Imphal. J Family Med Prim Care 2020;9:4741-6

23. Chakraborty T, Karmakar N, Nag K, Datta A, Saha PK, Biswas C. A cross-sectional study regarding knowledge, attitude and practice of hand washing among health care providers in a tertiary care hospital of Tripura. IJMSCI 2018;5:3527-31.

Predictors of Functional Recovery of Upper Limb Following acute Ischemic Stroke

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Abstract

Background: Although age-standardised rates of stroke mortality have decreased worldwide, overall stroke burden has significantly increased over the last two and half decades especially in developing countries.

Objectives: To predict the functional recovery of upper limb potential after acute ischemic stroke.

Methods: 51 people were recruited and studied. SAFE, NIHS Score, Median nerve SSEP, Conventional MRI brain imaging are done for all 51 patients. 40 patients were cooperative for further DTI neuroimaging & FA value analysis done within 1wk of stroke onset. Standard care & rehabilitation given. Followed up for upper limb recovery with ARAT scores at 1st, 2nd & 3rd months. Clinical, electrophysiological and neuroimaging recovery variables of upper limb were analyzed between two groups.

Results: FA asymmetry index of posterior limb of internal capsule (PLIC) suggest more structural asymmetry of PLIC and poor recovery. There is a significant negative correlation between fractional anisotropy asymmetry index and ARAT III score. Correlation coefficient (r) is -0.319.

Conclusion: With initial simple clinical assessment scales most of the recovery can be predicted and thereby patient expectations can be managed and use effective targeted rehabilitation strategies, time & resources to bring the best outcome.

Keywords: Stroke, Ischemia, ARAT score, PLIC

Introduction

In accordance with the WHO, stroke was defined as "rapidly developing clinical symptoms and/or signs of focal, and at times global, loss of cerebral function, with symptoms lasting more than 24 hours or leading to death, with no apparent cause other than that of vascular origin."[1]

Stroke is the third most common cause of long-term adult disability.[2] Stroke recovery is heterogeneous and it is estimated that 25% to 74% of

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stroke survivors worldwide require some assistance or are fully dependent on caregivers for activities of daily living (ADL) after stroke.[3] Independence at 6mon is predicted by age, NIHSS Scale, Upper limb function. The recovery of motor function, particularly of the upper limb determines the ability to independently undertake activities of daily living.[4]

Almost one half of the disease burden in low- and middle-income countries is now from noncommunicable diseases.[5] Ischemic heart disease and stroke are the largest sources of this burden. Globally, the incidence of stroke due to ischemia is 68%, while the incidence of haemorrhagic stroke (intracerebral haemorrhage and subarachnoid haemorrhage combined) is 32%, reflecting a higher incidence of haemorrhagic stroke in low- and middle-income countries.[6]

The most important primary health goal for stroke is prevention. However, the effective therapies in the acute phase (stroke unit management, thrombolytic, and other reperfusion therapies), as well as rehabilitation and long-term follow-up efforts to prevent stroke recurrence and improve functional outcomes substantially & reduce the burden of stroke.

Materials and Methods

Study design: Prospective observational study

Study site: Osmania General Hospital and Kamineni hospitals, Hyderabad.

Sample size: 51Patients

Study Duration: 2016 to 2018

Inclusion Criteria:

- Patients with acute ischemic stroke within 3 days of onset
- Patients aged >18yrs

Exclusion Criteria:

- Patients with prior h/o Stroke/ seizures
- MRI contraindicated patients, pregnant patients
- Patients with bilateral or posterior circulation strokes or cardioembolic strokes

60 eligible patients were approached. 9 didn't give consent. Hence 51 patients were recruited in this study. All the recruited 51 patients were assessed clinically using Shoulder Abduction and Finger Extension (SAFE) score, National Institute of Health Stroke (NIHS) score initially. All the patients were assessed electro physiologically by seeing the presence or absence of Somatosensory Evoked Potentials (SSEP). All the patients have undergone neuroimaging using 1.5 Tesla Siemens Magnetom Symphony. Conventional MRI done with 1.5 Tesla siemens Magnetom Symphony Scanner, Erlangen, Germany using a quadratome head coil.

40 out of 51 patients were cooperative for diffusion tensor imaging (DTI) and FA analysis which was done with one week of stroke onset, mostly within 3days. Multidimensional Diffusion Weighted DTI imaging – echo planar images were acquired with double spin echo sequence. FA, eigen vectors, ADC were calculated in the region of interest and were compared with contralateral white matter. The structural integrity of the posterior limb of the internal capsules was quantified by calculating an asymmetry index from the mean absolute fractional anisotropy.

They are managed accordingly with iv thrombolysis or antiplatelets and statins along with standard care & rehabilitation. Functional recovery of affected upper limb is assessed with Action Research Arm Test (ARAT) score in the follow up. Based on the post stroke 3rd month recovery ARAT scores patients are grouped into good recovery and poor recovery. Clinical, electrophysiological and neuroimaging predictive variables of functional recovery of upper limb were analysed between those two groups.

Statistical analysis: The data are analysed accordingly using SPSS software. ARAT scores are analysed with ANOVA. Linear regression was used to explore correlations between ARAT and fractional anisotropy asymmetry index and SAFE score. An alpha of <0.05 was considered statistically significant.

Observation and Results

In our study, 27 patients out of 33 male and 12 patients out of 18 female have good recovery. There is a no significant association between sex and upper limb recovery following stroke in our study. In our

study patients aged 31-60yrs are 29 and aged 61-90yrs are 22 in number. 26 patients aged 31-60yrs and 13 patients aged 61-90yrs had good recovery. Thus in our study, there is a significant association between age and upper limb recovery post stroke.

Table 1: Post-stroke recovery based on ARAT III (3rd month post stroke) score

ARAT III score (0-57)	Recovery	Frequency	Percentage
34-57	Good	39	76.5 %
0-33	Poor	12	23.5 %
Total		51	100%

In our study 39 (76.5%) patients out of 51 had normal to near normal recovery and were able to do all to most of daily living activities independently.

Time Interval Between Stroke Onset to Hospital:

Mean time interval between stroke onset to hospital is 28.23 hrs. Minimum time interval is 1/2hr. Maximum time interval is 72hrs. 39 (76.5%) patients presented within 24hrs. Out of them 6 (11.8%) people are within window period (t- <=4hr). Three patients received thrombolysis. Remaining 3 were not thrombolysed due to uncontrolled accelerated hypertension associated high risk of hemorrhagic transformation. There is no significant association between recovery and time interval between stroke onset to hospital.

Hospital Stay Duration:

Mean hospital stay duration is 6.12 days. Maximum duration is 26days. Minimum duration is 1 day. Patient with maximum duration had post stroke complications and poor recovery. There is no significant association between hospital stay and recovery.

Complications:

During hospital stay 5 patients developed post stroke complications. Three patients developed UTI out of whom two had poor recovery and one had good recovery. One patient developed aspiration pneumonia and had poor recovery. One patient developed worsening of neurological deficit and had poor recovery. There is a significant association between post stroke complications and recovery.

Table 2: SAFE / NIHS / NIHS motor subset / Upper limb average MRC Scores

	Recovery	N	Mean	Std. Deviation	Std. Error Mean
SAFE Score	GOOD	39	4.744	2.9264	.4686
	POOR	12	1.667	2.6054	.7521
NIHS Score	GOOD	39	7.103	3.2101	.5140
	POOR	12	12.417	4.1442	1.1963
NIHS UL motor subset	GOOD	39	2.026	1.0127	.1622
	POOR	12	3.417	.9962	.2876
UL MRC average	GOOD	39	2.315	1.4588	.2336
	POOR	12	.800	1.2849	.3709

Our study showed significant association between SAFE score and post stroke recovery, NIHS score and post stroke recovery, NIHS motor subset score and post stroke recovery and UL average MRC score and post stroke recovery. Average MRC score of upper limbs is taken as recovery of both proximal and distal part of upper limb is required for functional independency.

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Table 3: Electrophysiological analysis vs recovery

	Good Recovery	Poor Recovery	Total
PRESENT	35 (77.8%)	10 (22.2%)	45 (100.0%)
ABSENT	4 66.7%)	2 (33.3%)	6 (100.0%)
TOTAL	39 (76.5%)	12 (23.5%)	51 (100.0%)

In our study there is no significant association between SSEP and post stroke recovery.

Table 4: MRI Brain Characteristics of Stroke

Variable	Good Recovery	Poor Recovery
Dominant Hemisphere (%)	22 (75.86%)	7 (24.14%)
Vascular Territory involved		
Middle Cerebral Artery (%)	31 (77.50%)	9 (22.50%)
Posterior Cerebral Artery (%)	4 (57.14%)	3 (42.86%)
Anterior Cerebral Artery (%)	4 (100%)	0 (0)
Cortical (%)	25 (78.13%)	7 (21.87%)
Motor Cortex (%)	19 (79.17%)	5 (20.83%)
Subcortical (%)	25 (71.43%)	10 (28.57%)
Centrum semiovale/ CR / IC (%)	18 (69.23%)	8 (30.77%)
Basal Ganglia (%)	14 (66.67%)	7 (33.33%)
Thalamus (%)	6 (85.71%)	1 (14.29%)
Subclinical Infarcts (%)	18 (81.81%)	4 (18.19%)
Cerebral small vessel disease (%)	5 (83.33%)	1 (16.67%)

There is no significant association between conventional MRI brain imaging stroke characteristics and the recovery. Evidence of prior subclinical infarcts or cerebral small vessel disease has no significant association with recovery and didn't affect the recovery outcome.

Table 5: Fractional Anisotropy Asymmetry Index

	RECOVERY	N	Mean	Std. Deviation	Std. Error Mean
AYMMETRY INDEX	GOOD	33	.032224	.0744702	.0129636
	POOR	7	.096571	.1221582	.0461714

More FA asymmetry index of posterior limb of internal capsule (PLIC) suggest more structural asymmetry of PLIC and poor recovery. There is a significant negative correlation between fractional anisotropy asymmetry index and ARAT III score. Correlation coefficient (r) is -0.319.

Discussion

Recovery of motor function particularly of upper limb after stroke defines the functional independency. It is difficult to predict as the patients with similar initial motor impairment may achieve disparate levels of motor function and independence. Clinical measures of initial motor impairment, neurophysiological biomarkers of corticospinal tract function, and neuroimaging biomarkers of direct and indirect descending motor pathways are related to motor outcomes.[7] The Predict Recovery Potential (PREP) algorithm combines clinical measures and neurophysiological and neuroimaging biomarkers that are sensitive to corticomotor pathway integrity to predict likely upper limb functional outcome.

Diffusion tensor imaging (DTI) is an advance non-invasive magnetic resonance imaging technique used to visualize and quantitate Corticospinal Tract, which is the most important neural tract for mainly upper limb motor function, especially for fine motor control of the hand in humans. Fractional anisotropy (FA) is an index of the diffusion characteristics of water molecules preferentially directed along the axis of major axonal pathways and reflect acute and permanent damage to pyramidal tracts to determine clinical motor deficit and outcome.[8]

In this study there is no significant association of recovery with time interval between stroke onset to hospital and duration of hospital stay. However patients who developed post stroke complications during hospital stay are found to have recovery significantly affected.

DTI and FA Asymmetry Index: FA values decreases progressively with the time in the ipsi-lesional pyramidal tract which provides insight on the progress of Wallerian degeneration.[9] It is a general agreement that FA value increases immediately after ischemic stroke onset and remains high for the next 1–2 days, then decreases significantly during the following stroke phases. In the metanalysis study done by Jing-fen Jin et al, FA values in the subacute phase (4 d–8 w) defined by using the Osborn criterion according to the DTI scanning time after ischemic stroke was a good predictor for functional motor recovery.[10] In contrary in our study we found a significant negative correlation between fractional anisotropy asymmetry index and ARAT III score.

Conclusion

Stroke recovery is heterogeneous. Predicting the functional recovery of motor function, particularly of the upper limb determines the ability to predict to independently undertake the activities of daily living. Clinical assessment scales have high significant predictive value of recovery. Thus, with initial simple clinical assessment scales most of the recovery can be predicted and thereby patient expectations can be managed and use effective targeted rehabilitation strategies, time & resources to bring the best outcome.

Ethical Clearance: Ethical clearance was obtained from the institutional ethics committee prior to the commencement of the study.

References

1. Miller EL, Murray L, Richards L, Zorowitz RD, Bakas T, Clark P, et al. Comprehensive overview of nursing and interdisciplinary rehabilitation care of the stroke patient: A scientific statement from the American heart association. Stroke. 2010;41(10):2402–48.

2. Veerbeek JM, Kwakkel G, Van Wegen EEH, Ket JCF, Heymans MW. Early prediction of outcome of activities of daily living after stroke: A systematic review. Stroke. 2011;42(5):1482–8.

3. Katrak P, Bowring G, Conroy P, et al. Predicting upper limb recovery after stroke: the place of early shoulder and hand movement. Arch Phys Med Rehabil 1998; 79:758.

4. Smania N, Paolucci S, Tinazzi M, Borghero A, Manganotti P, Fiaschi A, et al. Active finger extension: A simple movement predicting recovery of arm function in patients with acute stroke. Stroke. 2007;38(3):1088–90.

5. Nijland RHM, Van Wegen EEH, Harmeling-Van Der Wel BC, Kwakkel G. Presence of finger extension and shoulder abduction within 72 hours after stroke predicts functional recovery: Early prediction of functional outcome after stroke: The EPOS cohort study. Stroke. 2010;41(4):745–50.

6. Kamalakannan S, Gudlavalleti AS V, Gudlavalleti VSM, Goenka S. Incidence & prevalence of stroke in India : A systematic review. 2017;(August):175–85.

7. Mensah GA, Connor M, Bennett DA, E PA, Sacco PRL, Anderson LM, et al. NIH Public Access. 2014;1(5).

8. Banerjee TK, Das SK. Fifty years of stroke researches in India. 2018;19(1):1–8.

9. Feigin VL, Roth GA, Naghavi M, Parmar P, Krishnamurthi R, Chugh S, et al. Global burden of stroke and risk factors in 188 countries, during 1990 – 2013 : a systematic analysis for the Global Burden of Disease Study 2013. LancetNeurol [Internet]. 2016;15(9):913–24.

10. Jin J, Guo Z, Zhang Y, Chen Y. Prediction of motor recovery after ischemic stroke using diffusion tensor imaging : A meta-analysis. 2017;8(2):99–105.

To Assess the Impact of IEC Activities on Knowledge of Family Planning among Adolescent Girls of 13-17 yrs in Rural Area of Amritsar

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Abstract

Back Ground: The major health issues among adolescent girls are early pregnancy, child birth, anemia. Lack of knowledge related to family planning among adolescent girls can adversely affect their and their children lives. Sexual activity in adolescent period is associated with ignorance about sex and sexuality and also predisposed by family traditions of early marriage that can lead to teenage pregnancies leading to illegal abortion, increased IMR and MMR. Adolescents should have knowledge of the health concerns and side effects of contraceptives so that they can make choices to prevent unwanted pregnancies.

Aims and Objectives: Assessing the impact of IEC activities on knowledge of family planning among adolescent girls of rural area of Amritsar.

Material and Methods: An interventional study was carried out among 13-17 years adolescent girls studying in the Government Senior Secondary Schools at Nagkalan and Sohian Kalan and out of school adolescent girls of the same age group residents of these two villages were also included in the study. IEC activities were done and after three months the effect of intervention was assessed. Among the enlisted 250 eligible adolescent girls, 230 were analyzed and valid conclusions were drawn.

Results: out of total 230 respondents, 73 (31.73%) respondents had correct knowledge about legal age of girl at marriage. Out of total 230 respondents, before intervention only 60 (26.0.8%) of the respondents heard about contraceptive methods, after intervention this percentage increased to 68.69%.

Conclusion: After intervention more number of adolescent girls had correct knowledge related to family planning.

Key words: Adolescent girls, Family planning, Rural.

Introduction

Adolescence is a crucial period of life having stress and storms. During this transitional stage that extends from 10-19 years, there occurs physical and psychological development that follows the period of puberty leading to adult hood.[1] Adolescents are the future parents, their reproductive health and decision they take affects the health and wellbeing of their family, community and country. Poor reproductive

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health knowledge in adolescence is associated with disease, abuse, exploitation, unwanted pregnancy and death.[2]

Reproductive health implies that people are able to have a satisfying and safe sex life and they have the capability to reproduce and have the freedom to decide if, when, and how often to do so and family planning is a way of thinking and living that is adopted voluntarily upon the basis of knowledge, attitude and responsible decisions by individuals and couples, in order to promote the health and welfare of the family group and thus contribute effectively to social development of a country. Although reproductive health has life cycle perspective but it is more crucial during adolescence.[3] Among adolescents, girls constitute a more vulnerable group, particularly in developing countries, where they are traditionally married at an early age and exposed to greater risk of reproductive morbidity and mortality. In India, every third adolescent girl in the age group of 15-19 years is married.[4] Mean age at marriage among female adolescents is 14.7 years and the mean age of cohabitation slightly higher (15.5 years). Sexual activity in adolescent period is associated with ignorance about sex and sexuality and also predisposed by family traditions of early marriage that can lead to teenage pregnancies leading to illegal abortion, increased IMR and MMR. For safe motherhood family planning is a pillar.[5] Family planning is one of the effective methods for reducing maternal and child morbidity and mortality. Childbearing at an early age is often associated with a young woman's failure to complete her education and limiting her future job opportunities thus have effect on social and economic well-being.[6] Knowledge and proper use of contraceptive methods have had positive impact on maternal and child health. There is need for adolescents to have an access for proper information about sexual and reproductive health and contraceptive choices as there is marked increase in sexual activity among adolescents.[7] Most of the times they have wrong perceptions about reproductive health and risk of early pregnancy.[8] Adolescents should have knowledge of the health concerns and side effects of contraceptives so that they can make choices to prevent unwanted pregnancies.[9]. Government of India launched many programmes to improve access to reproductive and family planning services for adolescents.

Material and Methods

The study was carried out in the rural field practice area of Department of Community Medicine, Government Medical College, Amritsar which is under Primary Health Centre Threawal (Majitha Block) from 1st January 2018 to 31st December 2018. After taking permission from the District Education Officer, the list of Government senior secondary schools in the block was obtained from the office of District Education Officer. From the enlisted seven government senior secondary schools, two schools were selected i.e. Government Senior Secondary school Nagkalan and Government Senior Secondary school Sohian Kalan by using simple random technique (Lottery Method). In these schools adolescent girls of the age group 13 to 17 years were included and out of school adolescent girls of the same age group who were residents of these two villages were also included in the study. The age limit of 13 years was fixed because the average age of menarche is 12.5 years. The upper age 17 years was fixed as nearly 17% of all the girls are married by the age of 18 years in India. The heads of these institutions and class in-charges were explained about the importance and the purpose of study to elicit their full co-operation. A list of eligible adolescent girls was obtained from the teacher in charges. Schedule of the visits were made and intimated to the school authorities taking into consideration the holidays and examination of the students, so as not to disturb their study schedule. List of out of school adolescent girls was obtained with the help of health workers of these areas. The study was conducted in three phases. In pre-intervention phase the purpose of study was informed to the teacher in-charge and to the students. Those who were willing to participate were enrolled in the study and informed assent was taken from the class in-charge. Similarly with the help of ASHAs, eligible out of school adolescent girls were enrolled in pre-intervention by giving prior information regarding date and time of the visit and were asked to assemble at anganwadi center and sub center near their homes for participation and informed assent was taken from elderly female in the family. The

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questionnaire prepared in vernacular language was explained to them and were asked to fill it. Privacy and confidentiality was maintained and it was also conveyed that information collected will be used for study purpose only.

During intervention phase batches of 25 girls, who were enrolled in pre intervention phase were made. In each batch IEC sessions were conducted in vernacular language for 20-25 minutes regarding family planning eg: legal age of marriage, interval between two pregnancies. Queries related to the topic were also explained.

After 3 months, re-evaluation was done by administering them same questionnaire to assess the impact of Information, education and communication.

There were 250 eligible adolescent girls in the pre intervention test (214 were in both the schools and 36 were out of school adolescent girls in both the villages) but subsequently 14 in school girls and 6 out of school adolescent girls were absent in either intervention sessions or in post intervention test, so they were not included in the study sample. The sample therefore consisted of 230 adolescent girls.

Information obtained from the participants in pre and post intervention phase was compiled, analyzed and by using ratio, proportion and chi square test valid conclusions were drawn.

Results

Out of total 73 (31.73%) respondents had correct knowledge about legal age of girl at marriage. After intervention 68.9% had correct knowledge, change observed was statistically significant at p value less than 0.05 (Table no 1). Before intervention only 73 (31.73%) respondents knew that 3 years is the ideal interval between two pregnancies and after intervention more than 3/4th (81.73%) knew this, change observed was statistically at p value less than 0.05 (Table no 2). only 42(18.26%) respondents knew that father is responsible for determining the sex of female child and after intervention this percentage increased to 63.47%.(Table no 3). Before intervention only 31.73 % respondents knew that the ideal interval between two pregnancies is 3 years and after intervention 81.73 knew this, change observed was statistically significant at p value less than 0.05 (Table no 4).

Table 1: Distribution of Respondents According to Knowledge Related to Legal Age Marriage For Girls.

Response	Pre-intervention		Post intervention	
	Number of respondent	Percentage	Number of respondent	Percentage
Correct	73	31.73	158	68.69
Incorrect	157	68.26	72	31.30
Total	230	100	230	100

Correct response was taken as 18 yrs

Table 2: Distribution of Respondents According to Their Knowledge Regarding Ideal Interval Between two Pregnancies.

Knowledge	Pre-intervention		Post- intervention	
	Number of respondent	Percentage	Number of respondent	Percentage
Yes	73	31.73	188	81.73
No	157	68.26	42	18.26
Total	230	100	230	100

Correct answer was taken as 3 years

Table 3: Distribution of respondents according to their knowledge regarding who determine the sex of female child.

Response	Pre intervention		Post intervention	
	Number of respondent	Percentage	Number of respondent	Percentage
Mother	123	53.47	52	22.60
Father	42	18.26	146	63.47
Don't know	65	28.26	32	13.91
Total	230	100	230	100

Table 4: Distribution of Respondents Who Heard About any Family Planning Method (Contraceptives)

Response	Pre intervention		Post intervention	
	Number	% age	Number	% age
Yes	60	26.08	158	68.69
No	170	73.91	72	31.30
Total	230	100	230	100

Discussion

Out of total 230 respondents, 73 (31.73%) respondents had correct knowledge about legal age of marriage for girls. After intervention 68.9% had correct knowledge. A study conducted by Inamdar and Khan (2014) among adolescent girls of Nanded (Maharashtra), showed that 29.4% of the respondents had correct knowledge which is in concordance with present study.[11] A study conducted by Joshi and Gir (2017) among adolescent girls of rural area of Udaipur (Rajasthan) stated that after intervention knowledge regarding legal age of girl at marriage was increased from 42.5% to 96%, which is not in accordance with present study.[12] The reason might be that post intervention was conducted immediately in that study and it was conducted after 3 months.

Before intervention out of total 230 respondents only 42(18.26%) respondents knew that father is responsible for determining the sex of female child and after intervention this percentage increased to 63.47%. A study conducted by Rupali et al (2016) among adolescent girls of Faridkot city (Punjab) stated that 67.14% of respondents knew that father is responsible in determining the sex of female child which is not in accordance with present study.[13] The probable reason may be that in present study was conducted in rural area and most of the girls were in mid adolescence. Other study was in urban area among adolescent girls in late adolescent period.

Out of total 230 respondents, before intervention only 60 (26.0.8%) of the respondents heard about contraceptive methods, after intervention this percentage increased to 68.69%. A study conducted by Jain et al (2014) among school going adolescents in Wardha city of Maharashtra showed that 49% heard about contraceptive methods.[14] This is not in accordance with present study the reason might be that present study was conducted in villages and that study was conducted in city and in present study only girls were included and other study analyzed their results in both girls and boys.

Conclusion and Recommendations

After intervention more number of adolescent girls had knowledge regarding family planning so there is need to create awareness by IEC activities in the schools and anganwadi centers with help of school authorities, health workers and Anganwadi workers because adolescents are the future parents, their reproductive health and decision they take will affect the health and wellbeing of their family, community and country.

Ethical clearance –Taken from ethical committee of government medical college Amritsar

Source of funding – Self

Conflict of Interest -Nil

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References

1. Banerjee SB, Koley G, Gupta K. RELATIONSHIP OF BODY MASS INDEX (BMI) WITH PHYSICAL ACTIVITY AND STRESS IN ADOLESCENT SCHOOL-GOING GIRLS.

2. Shaw D. Access to sexual and reproductive health for young people: bridging the disconnect between rights and reality. International Journal of Gynecology & Obstetrics. 2009 Aug 1;106(2):132-6.

3. World Health Organization. A framework to assist countries in the development and strengthening of national and district health plans and programmes in reproductive health: Suggestions for programme managers. World Health Organization; 2002.

4. Singh PK, Rai RK, Alagarajan M, Singh L. Determinants of maternity care services utilization among married adolescents in rural India. PloS one. 2012 Feb 15;7(2):e31666.

5. Ahmed S, Li Q, Liu L, Tsui AO. Maternal deaths averted by contraceptive use: an analysis of 172 countries. The Lancet. 2012 Jul 14;380(9837):111-25.

6. Agarwal B, Panda P. Toward freedom from domestic violence: The neglected obvious. Journal of human development. 2007 Nov 1;8(3):359-88.

7. Mohammadi MR, Mohammad K, Farahani FK, Alikhani S, Zare M, Tehrani FR, Ramezankhani A, Alaeddini F. Reproductive knowledge, attitudes and behavior among adolescent males in Tehran, Iran. International family planning perspectives. 2006 Mar 1:35-44.

8. Ram S, Andajani S, Mohammadnezhad M. Parent's perception regarding the delivery of sexual and reproductive health (SRH) education in secondary schools in Fiji: A qualitative study. Journal of environmental and public health. 2020 Jan 9;2020.

9. Chandra-Mouli V, McCarraher DR, Phillips SJ, Williamson NE, Hainsworth G. Contraception for adolescents in low and middle income countries: needs, barriers, and access. Reproductive health. 2014 Dec;11(1):1-8.

10. Agrawal D. Adolescent Health Determinants for Pregnancy and Child Health Outcomes among the Urban Poor Sunil Mehra. Indian Pediatrics. 2004;41:137-45.

11. Inamder M, Inamdar S, Khan YZ. Assessment of knowledge and attitude on family life of adolescent girls. National Journal of Community Medicine. 2014;5(4):364-6.

12. Puja J, Sophia G. Interventional study to assess knowledge and practice among rural adolescent girls regarding menstruation and their perception of taboos. Asian Journal of Home Science. 2017;12(1):114-20.

13. Gupta S, Bhatti SG, Padda P, Devgan S, Monga S. Evaluation of pattern and perception status of reproductive and sexual health among school going adolescents in Faridkot city, Punjab. Journal of Advanced Medical and Dental Sciences Research. 2016;4(2):118.

14. Jain M, Jain S, Patil S, Bang A. A study on knowledge attitude and practice of contraception in school going children in Wardha district in central India. International Journal of Reproduction, Contraception, Obstetrics and Gynecology. 2014;3(4):903-8.

An Explanation of how the Corona Virus (Covid-19) and other Similar Viruses Eork

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Abstract

The common symptoms of corona virus (Covid-19), the patients' absence the sense of taste and smell and these cannot be happened unless this virus reaches control system (the brain). Physiologically it is so difficult to stop these senses without reaching their nervous connections in the brain. In addition, about 500 patients of Covid-19 showed supporting different symptoms: Paralysis of one or both limbs, memory loss for a period of time, Anorexia, weakness, abnormal nervousness, sleeping too much or less than normal, headache, hair loss, Eyes strain and redness, and knowing the person infected with Corona through them, Skin stiffness, Delirium in sleep and in waking, Inability to speak normally and others. All these indicate that the virus reaches the brain. For supporting this study aim selective bio- laboratory tests were measured for hundred patients with covid-19; C.R. Protein, E.S.R., D-Dimer, L.D.H and ferritin. Results of this bio-tests support this study aim.

Key words: Covid-19, Brian, membrane, lipid and bio-tests.

Introduction

Coronavirus disease (COVID-19) is an infectious disease caused by a newly discovered coronavirus. Most people infected with the COVID-19 virus will experience mild to moderate respiratory illness and recover without requiring special treatment. Older people and those with underlying medical problems like cardiovascular disease, diabetes, chronic respiratory disease, and cancer are more likely to develop serious illness [1]. A novel studies found that the immune system attack corona virus in the brain[2, 3], soldiers of immune system know better than others how corona viruses attack the body and where. When knowing the place of the battle so it can prevent this virus from this place and destroyed it. It is obvious that the brains of older people differ younger people [4] easy to penetrate by different viruses specially corona. All these indications showed one fact which is corona and other likes viruses reach the brain and immune system attack it there but either it win or not. However, it is important to know that immune system attached corona virus so it should study how can help this system for killing these viruses.

Materials and Method

In this study five different procedures and

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techniques was done which are obtained from specific pharmaceutical bio-kits for measuring different bio parameters C.R. Protein, ESR, D. Dimer, LDH and Ferritin. Materials and procedures of these bio-tests are shown in their kits.

Results

The averages of the results of hundred patients of this study were taken as follow:

Age	C.R. Protein	Normal value	ESR	Normal value	D. Dimer	Normal value	LDH	Normal value	Ferritin	Normal value
34.18	45.68	0-6 mg/dl	42.92	0-20 mm/hr	0.84899	<0.5 mg/L	364.95	<225-300	625.64	5-124 ng/ml

Discussion

C.R. Protein is a protein made by the liver and it is sent into bloodstream in response to inflammation. C.R. protein and Erythrocyte sedimentation rate (ESR) show there are serious infections.

A lactate dehydrogenase (LDH) test measures the amount of LDH in the blood. Lactate dehydrogenase is an enzyme that the body uses during the process of turning sugar into energy for cells to use. This test, C.R. protein and ESR bio-tests show there are highly infection in corona patient's bodies while these tests show increasing in bodies' energy.

Ferritin test helps to understand how much iron in the body stores. This last result show different indication difficult to explain! Patients' bodies do not get additional iron so increasing of ferritin means there are high amounts from iron are produced continually which means the rate of degradation of hemoglobin and other like molecules such as cytochromes and flavoproteins is much higher than their formation rate. Rate of degradation easier, less energy intake but it needs energy too!

Results of this study indicates that covid-19 increase patients energy but the body does not get additional energy also patients bodies look like losing its energy not getting more. In fact, only above tests were done, because same results should get from other additional different bio-tests.

It is incredible results that patients bodies lose energy in same time them body raise it. These results and other symptoms such as; absence the sense of taste and smell, Paralysis of one or both limbs, memory loss for a period of time, Anorexia, weakness, abnormal nervousness, sleeping too much or less than normal, headache, hair loss, Eyes strain and redness, and knowing the person infected with Corona through them, Skin stiffness, Delirium in sleep and in waking, Inability to speak normally and others, are indicate that different viruses do not reach any organ in the body they reach the brain especially it has fatty membrane!

Human body has one weak point which is its nose, because the air contains different molecules part of them harmful such as different viruses while others not. When these creatures entering human body through the nose part of them reach either lungs or stomach and other part went to the brain. Viruses cannot survive in the lung or stomach because acidity of stomach should destroyed it and also different molecules in the lungs should do same. Therefore, viruses do not survive in these organs. In addition, these viruses cannot reach all human cells.

Different viruses have same molecules either DNA with protein or RNA with protein so these molecules cannot go beyond lungs or stomach, different molecules should react with them and destroyed them. Chemically above molecules cannot stay as it is in these organs due to huge amounts of different molecules.

At pH=2 of the stomach, phosphate groups become phosphoric acid (H_3PO_4) destroying DNA and RNA chains and producing nucleosides. In addition, these molecules should split to nitrogen bases and ribose or deoxy ribose. These molecules are useful for human body, are not harmful. Furthermore, Stomach's acidity should destroyed proteins molecules of different viruses and also specific enzymes in the stomach should do this too. Therefore, different viruses cannot survive in the stomach.

There is another path for viruses in addition to the mouth which is the nose. This path has two ways either to the brain or to the lungs, when these creatures reach the lungs the blood should eat them. Human's blood contains huge different molecules such as; different proteins, different enzymes, different hormones, different ions, different nucleotide such as; ATP or GTP, most important high concentration from oxidative oxygen…etc. viruses cannot survive from these molecules they should dissolve in them even in high amounts. Viruses are just DNA or RNA with protein covered by lipid or not[5] so blood's molecules in specific way or another should react with them leading to change them. In fact, there is no study find any virus beyond lungs or stomach[2].

Different viruses with fatty membrane are most dangerous to human health because they enter the body through the nose reaching the brain due they have fatty membrane. Brian contains fatty molecules so easy for different viruses with fatty membrane reach it. This indication is obtained from all symptoms that mentioned before; losing the sense of taste and smell, Paralysis of one or both limbs, memory loss for a period of time, Anorexia, weakness, abnormal nervousness, sleeping too much or less than normal, headache, hair loss, Eyes strain and redness, and knowing the person infected with Corona through them, Skin stiffness, Delirium in sleep and in waking, Inability to speak normally and others.

In fact, no one can predict what COVid-19 does in the brain so its patients show above different symptoms and maybe there are more. In addition, results of this study showed that the virus increase human's body energy and this does not happen they affect energy controlling center the brain (the pituitary gland).

Old people are most affecting by coronavirus because their brains are softer than younger people, easer for different viruses especially covid-19 to penetrate through.

Many cases of covid-19 of this study cases indicate that they got corona's infection from their kids or from other kids, physiologically; older people have same organs and same tissues of younger or kid people so why they are immune from corona virus rather than older people?

It is so obvious that older people have soft brain tissues than younger or kid people especially tissues of nose-brain path tissues.

The last evidence is the most important one because it so clear that corona virus and other viruses such as Flu cause fever. Fever is heat mean patients increase their energy and this does not happen they show weakness, this matter should be confused because no energy added and there is fever appears. In addition, different viruses do not reach all cells of the body making them work to give fever power.

Moreover, above results especially ferritin bio-test and other tests show that corona's patient should increase its energy.

Human's moving, working and some involuntary organs work due to controlling system (the brain). This system controlling human's energy so when different viruses such as Flu, corona…etc. reach it so they should affect controlling process leading to fever. Nothing can stop senses (taste and smell) and show fever without reaching their controlling centers in the brain.

It is important to notice that the amount of corona virus that reaching the brain are most important factor to do an effect on human body.

In addition to all above evidences of this study, different cells of immune system of human body knew very well better than everything else the location of different viruses' attack [3]. Therefore, this system attacks viruses in the brain where they attacked the body but it has polar properties while the brain is nonpolar organ, this why immune system fails to protect the body from corona virus, so it should help this system by everything that can close the weak point (Nose).

It is obvious now that muzzle play important role in fighting of corona virus because it covering the weak point of human (the nose). In fact, there is a path from the nose to the brain especially for fatty molecules but it is physiological science beyond this study.

Finally, it is important to industry new muzzle better than normal used one to do better protection for human's health against different viruses especially that have fatty membrane.

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Conclusions

Different viruses especially which has lipid membrane, attack human's body through its nose to its brain and they effect its body by effecting its brain so when knowing this fact it's easy to protect human body against different viruses including corona virus.

Ethical clearance:- This research was done by our department giving good results.

Source of funding:- Self funding.

Conflict of Interest:- Nil.

References

1. World health organization (WHO) "there is a current of outbreak of Coronavirus (COVID-19) disease" overview, 2021.

2. Mayuri Gupta and Donald F. Weaver "COVID-19 as a Trigger of Brain Autoimmunity" ACS Chem. Neurosci, (2021), 12, 14, 2558–2561.

3. Lee MH and et al "Injury in the Brains of Patients with COVID-19" New England J. of Med., (2020), 30.

4. Ruth Peters "Ageing and the brain" Post. Med J, (2006), 82(964): 84–88.

5. Personal communications with Dr. Hasan Salam specialized in Viruses, college of science- University of Misan.

Two Years Retrospective of Trauma Incidents presented to Emergency Department, JDWNRH. (Jan 2014-Dec 2015)

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Abstract

Trauma is the leading cause of morbidity and mortality in population worldwide. When the patient is received in trauma unit, first consideration always goes to life-threatening injuries, open wounds, and radiologically visible injuries. Emergency department in JDWNRH is the apex hospital in the capital (Thimphu) and had been functioning as one of the emergency medical centers and serves for all the emergencies of Bhutan. The study was about analysing all trauma and injured cases presented to emergency department of JDWNRH within 2 years (January 2014- December 2015) retrospectively. It is an observational and descriptive statistic on demographic profile, time of the presentation, types of injuries which will be useful in assessing the impact by various injuries in the population and the development of preventive measures. Beside fall injury, the road traffic accident had been increasing in the capital city. The numbers are not significantly high for other injuries but, the impact from individual injury is noticeably substantial as there were admission to the wards, ICU, OT, and several were even brought dead. Statistically, men were twice the number of women even though there are women who were injured. Frequent prevention and promotion are essential as it can potentially reduce the incidence of emergency visit. Through zero tolerance day, the number had reduced as presented in the chart, however, the prevalence of trauma remained high.

Key Words: Trauma, Injuries, life-threatening, morbidity, mortality.

Introduction

Trauma is the leading cause of morbidity and mortality in population worldwide. As a patient is received in a trauma unit, first attention always goes to life-threatening injuries, open wounds, and radiologically visible injuries. Emergency department in JDWNRH is the apex hospital in the capital, Thimphu and had been functioning as one of the emergency medical centers and serves for all the emergencies of Bhutan. The study was to investigate trauma related injuries and the conclusion obtained by this study should be useful for assessing the impact of this type of injuries in the population and the development of preventive measures. Although no systematic information is available regarding trauma cases in Bhutan, police reports and data from the hospitals reveal escalating occurrences of trauma

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cases. The statistical analysis was done to determine different types of trauma cases in emergency department in JDWNRH and identify characteristics associated with trauma patients over the 2 years of period. The Emergency Department (ED) visit is generally preceded by an urgent condition due to injury, accident, disaster, or disease that requires immediate medical management.[2] Trauma continued to be a major public health problem worldwide as it is associated with high morbidity and mortality both in developed and developing countries. And it had been reported to be the leading cause of death, hospitalization, and long-term disabilities in the first four decades of life. Age and likelihood of admission to trauma centre for injured patients were observed with the factors which play a major role in determining which injured receive trauma care. Elderly persons account for an increasing number of trauma patients. Morbidity and mortality from traumatic injury are higher in elderly patients compared with younger patients. While trauma is at times unforeseeable or inevitable but developing community awareness about prevention measures can potentially reduce the number of emergency visits.[1] Though it was shown that women had higher rate of injuries than men[3] but in Bhutan, the numbers are high among men although there are women who were injured. The injuries, illnesses and fatalities always have the impact on social and economic burden among injured people, subsequently it is important of awareness and to focus special on injury prevention.[4] To prevent certain proportion of avoidable deaths through trauma and reduce injuries, the suggestion to improve trauma treatment process and trauma rescue system were required.[5] We set up the Triage system which eventually helped to assess the injured cases according to the severity triage color code Red, Yellow and Green. The ZERO tolerance implemented by the police department had drastically reduced the preventable injuries, however, the public health education is required continuously to promote the public to prevent themselves from life threatening injuries.

Methodology

Retrospective analysis of trauma cases presented to emergency department of JDWNRH within 2 years (January 2014- December 2015).

Statistics

The data which is recorded in the excel sheet in the triage area was further analysed by SPSS 17 to extract the report demographically, types of injuries and the treatment eventually.

Study limitations

It focuses only in JDWNRH, nevertheless, we have involved all the referral from districts hospital.

Results

Prevalence

The prevalence of trauma remained still high although the total number had reduced as in the figure and the referral cases related to trauma had remained high.
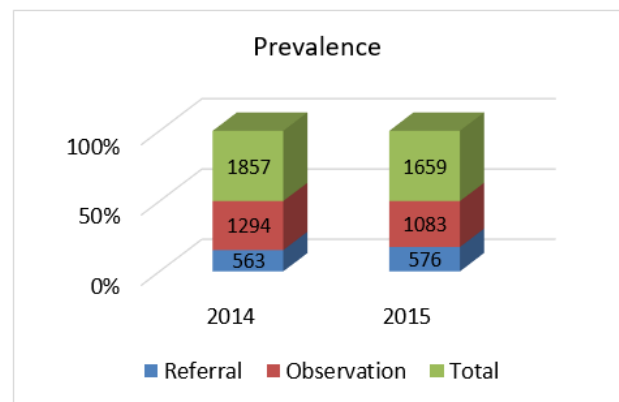
Figure 1: The number of the patients visited emergency department in 2014 and 2015 (n=3516)

Injuries

Types of injuries seen among the trauma patients are stab injury, self-harm, penetrating injury, pedestrian struck, RTA, fall injury, burn, bull gore, bear maul, assault and others which are undefined minor injuries. Among different types of injuries, fall injuries is the highest followed by road traffic accident. Among different category of injuries, the injury from fall is the highest followed by RTA. Next to fall injury, the road traffic accident had been increasing in the capital city.
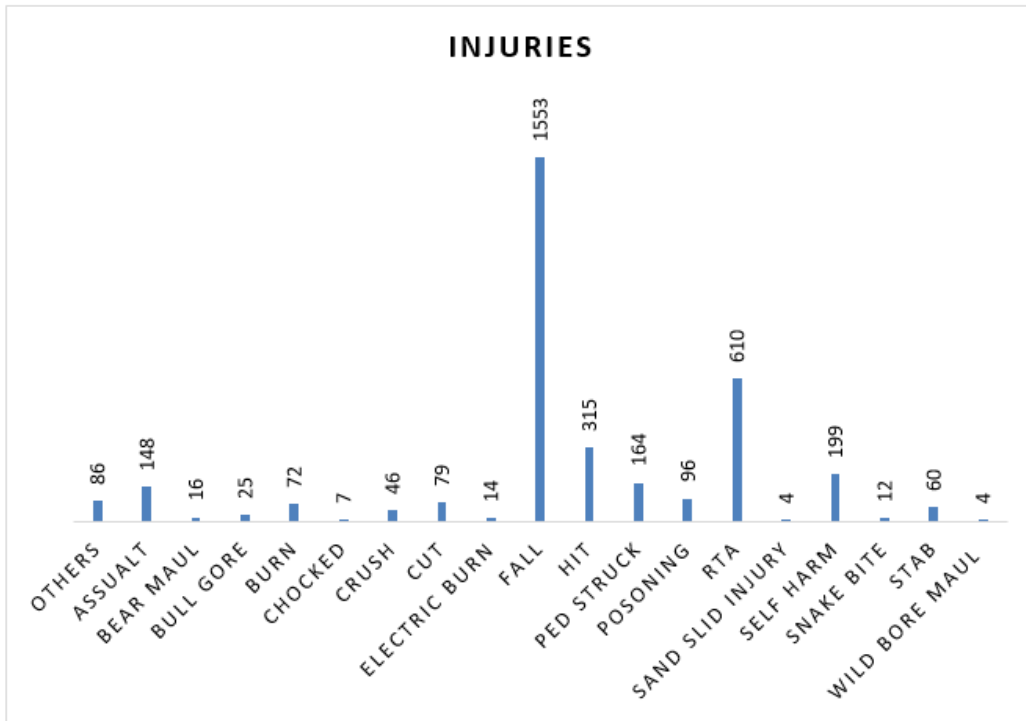
Figure 2: Types of injuries among the patients in 2014 and 2015 (n=3510)

Disposition

There are patients admitted to the wards respectively and ICU and even to OT as reflected in the chart depending on the injuries which evidently indicates the severity of the trauma. Prevention and Promotion is essential as the impact from individual injury is clearly substantial.
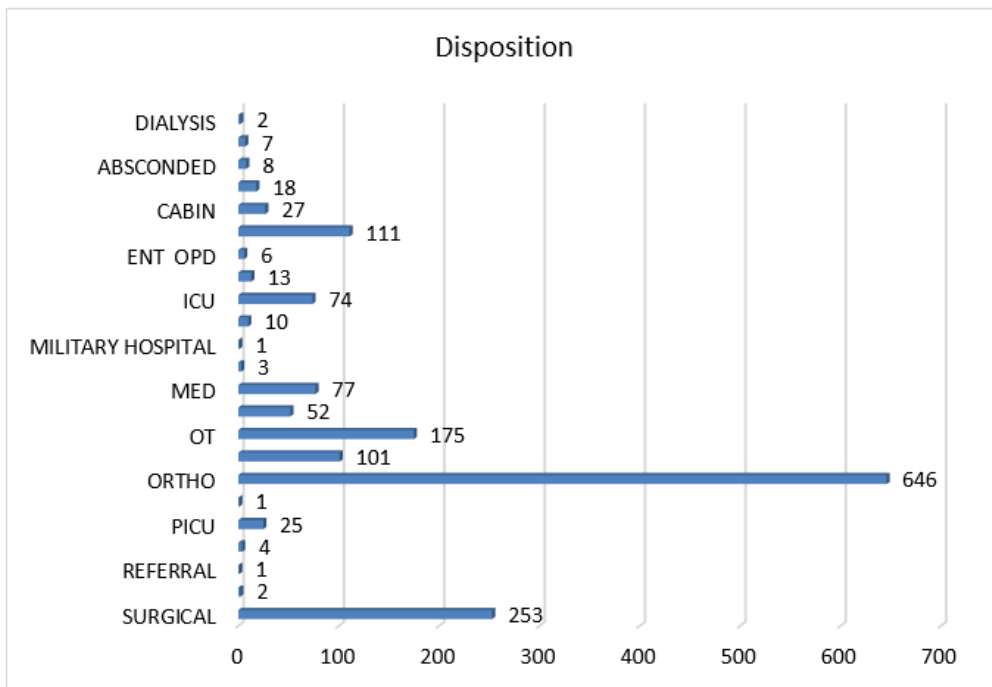
Figure 3: Disposition of the patients in 2014 and 2015 (n=1621)

Gender and Shift Patterns

Statistically, majority were men 62% in 2014 & 67% in 2015 (twice the number of women) despite the fact there are women who were injured. Referrals are relatively high during the evening shift.
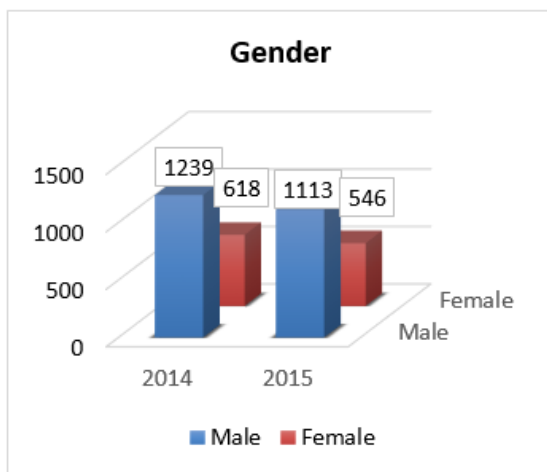
Figure 4: Gender (n=3516)
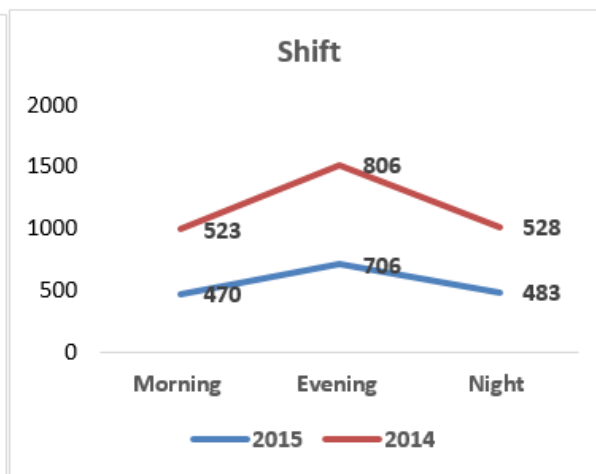
Figure 5: Shift system (n=3516)

Discussions

Based on the graphical presentations, Figure 1 shows that the prevalence of trauma remained still high (1857 in 2014 and 1659 I 2015) although the total number had reduced as in the figure, but the referral cases related to trauma had remained high. According to figure 2 above, types of injuries among the trauma patients are stab injury, self-harm, penetrating injury, pedestrian struck, RTA, fall injury, burn, bull gore, bear maul, assault and others which are undefined minor injuries. Among different category of injuries, the injury from fall is the highest followed by RTA (Road Traffic Accident). Following fall injury, the road traffic accident had been increasing in the capital city. Figure 3 above shows the disposition of the patients admitted to the wards in 2014 and 2015 respectively. The chart shows the patient admitted to ICU (Intensive Care Unit) and OT (Operation Theatre) depending on the injuries which evidently indicates the severity of the trauma. Prevention and Promotion is essential as the impact from individual injury is clearly substantial. Figure 4 indicates that majority were men, 62% in 2014 & 67% in 2015 (twice the number of women) even though there are women who were injured. Figure 5 shows that referrals are relatively high during the evening shift.

Conclusion

The prevalence of the injury is 1857 in 2014 and 1659 in 2015. Fall injury is the highest followed by RTA among the different types of injuries. Beside fall injury, the road traffic accident had been increasing in the capital city. Statistically, men were twice the number of women, though, there are women who were injured. People are being more vigilant as we even have Zero tolerance day observed by the department of police. There are patients admitted to the wards respectively as reflected in the chart depending on the injuries and some were even brought dead, which evidently indicates the severity of the trauma. Prevention and Promotion for every injury is essential constantly because the prevalence of trauma remained still high and the impact from individual injury is clearly substantial.

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Limitations: The limitations are that data are collected at the triage area by the staff who are non-researchers, and it was conducted retrospectively. Biases may be as the result of unclear or erroneous clinical documentations.

Ethical Consideration: The study was approved by the ethical committee on 5th June 2016. **REBH/Approval/2016/020.**

References

1. Jung Chia-Pei., Tsai Aileen, and Chen, Ching-Ming. **A 2-year retrospective study of pediatric dental emergency visits at a hospital emergency center in** Taiwan. Biomed J. 2016 Jun; 39(3): 207–213. doi: 10.1016/j.bj.2016.06.004 PMCID: PMC6138820.

2. Wong N.H., Tran C., Pukallus M., Holcombe T., Seow W.K. **A three-year retrospective study of emergency visits at an oral health clinic in South-East Queensland.** Aust Dent J. 2012; 57:132–137. [PubMed] [Google Scholar]

3. Vittorini Pierpaolo, D'Aloisio Francesco, Muselli Mario, Giuliani Anna Rita, Mascitelli Alfonso, and Fabiani Leila. **Retrospective Analysis of Injuries and Hospitalizations of Patients Following the 2009 Earthquake of L'Aquila City.** Int J Environ Res Public Health. 2019 May; 16(10): 1675. Published online 2019 May 14. doi: 10.3390/ijerph16101675 PMCID: PMC6571652PMID: 31091681.

4. Alzghoul Manal M., Shakhatreh Mohammed K, and Al-sheyab Nihaya. **Unintentional Injuries and Violence among Adults in Northern Jordan: A Hospital-Based Retrospective.** Int J Environ Res Public Health. 2017 Apr; 14(4): 343. Published online 2017 Mar 24. doi: 10.3390/ijerph14040343 PMCID: PMC5409544PMID: 28338614.

5. Wang Tianbing, Wang Yanhua, Xu Tingmin, Li Libing, Huo Mingli, Li Xian, et al. **Epidemiological and clinical characteristics of 3327 cases of traffic trauma deaths in Beijing from 2008 to 2017 a retrospective analysis.** Medicine (Baltimore). 2020 Jan; 99(1): e18567. Published online 2020 Jan 3. doi: 10.1097/MD.0000000000018567 PMCID: PMC6946352 PMID: 31895799.

Effect of Patellar Realignment Training in Patellofemoral Pain Syndrome

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Abstract

Objective: PFPS is a common musculoskeletal dysfunction presenting with anterior knee pain. The purpose of this study was to investigate whether implementation of realignment training can achieve early pain and functional ability improvements in patients with PFPS

Method: 37 females, 20-45 year of age with PFPS, were randomly assigned into two treatment Group 1 received realignment training in addition to conventional treatment protocol whereas Group 2 as a control group received routine treatment for 4 weeks. The outcome measures was Visual analogue scale (VAS), range of motion, manual muscle testing (MMT), Q angle, postural assessment.

Results: The results obtained show that both the groups showed significant improvement in the outcome variables and therefore aids with early correction of dysfunction. Within group analysis showed statistically more significant improvement in all outcome measures for Group 1.

Conclusion: This Is a cross sectional study comparing effect of realignment training and the conventional treatment protocol in PFPS on 37 total subjects. We found that realignment training showed significant improvement in the outcome variable concluding that it improves functional ability and reduce pain. It can be further concluded that Conventional treatment can be more efficacious if combined with realignment training.

Keywords: [Patellar realignment training, patellofemoral pain syndrome, anterior knee pain, k-taping, mobilization with movement, Alta, Q-angle]

Introduction

Pain syndrome (PFPS) is one in every of the most common knee complaints, especially among females[1]. The incidence within the general population is 25% in adolescents and adults [1,2]. Patellofemoral pain syndrome (PFPS) is difficult to define, as patients experience a range of symptoms from the patellofemoral joint with different levels of pain and physical impairment. The term 'anterior knee pain' is recommended to encompass all pain-related problems of the anterior part of the knee. The term 'patellofemoral' seems appropriate, as no distinction are often made as to which specific structure of the

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patella or the femur is affected. 'Pain' is the symptom that each one patients experience, but patients produce other symptoms likewise, and thus it's appropriate to use the word 'syndrome', defined as a bunch of signs and symptoms that occur together and characterise a particular abnormality[3]. PFP may be a chronic, painful condition predominantly of insidious onset, which regularly persists despite provision of evidence-based treatments[2]. It is usually experienced during running, squatting, stair climbing, prolonged sitting, and kneeling[4].

Stability of the patellofemoral joint (PFJ) is basically maintained by soft tissues, specifically, the dynamic balance of the medial and lateral quadriceps muscle[3]. By excluding anterior knee pain because of intra-articular pathology, peripatellar tendinitis or bursitis, plica syndromes, Sinding Larsen's disease, Osgood Schlatter's disease, neuromas and other rarely occurring pathologies it's suggested that remaining patients with a clinical presentation of anterior knee pain can be diagnosed with PFPS[3]. Patellofemoral pain is caused by many pathophysiological processes. A tightness of the soft tissue round the knee joint and a quadriceps muscle imbalance have frequently been described because the contributing factors in patellofemoral pain[6]. The abnormal relationship in the vastus medialis obliques (VMO) and vastus latralis (VL) activation pattern may modify the dynamics of the patellar-femoral joint. This imbalance may cause lateral tracking of the patella by the action of VL during knee extension[1]. Increased Q-angle, genu valgum, foot pronation, and/or joint overuse have been proposed as a number of the factors that predispose for PFPS[7]. These factors may induce a delayed contraction or weakness of vastus medialis oblique (VMO) with relation to vastus lateralis (VL), lateral displacement of the patella, and inadequate control of knee flexion during walking downstairs[8]. Several studies have reported various factors that cause PFPS, like quadriceps, abnormal hip biomechanics, inflexibility and malalignment of the lower limbs, and altered neuromuscular control. Among these, quadriceps tightness can cause patellar alta and patellar tilt, which end in quadriceps weakness and muscle imbalance caused by pain thanks to increased compression force of the patellofemoral joint and abnormal movements of the patella during knee motion thus, the progression of PFPS is also accelerated[9].

severity may remain unchanged or progress in 50% of affected individuals, often restricting an individual's participation in physical activity 40 and potentially reducing quality of life (QoL)[2]. However, its etiology remained unclear and controversial. Management may be challenging, a handy and non-operative treatment program usually allows patients to return to recreational and competitive activities. Physiatrics is that the first line of treatment for PFPS. The clinical efficiency of several different treatment regimens are studied; however, a recent systematic review reveals an absence of high-quality clinical trials during this area[10].

The purpose of this study was to determine the effect of realignment training (K-taping and Mobilization with Movement) in the treatment of patients with PFPS. We hypothesized that PFPS patients who received realignment training with the aid of K-taping and Mobilization with Movement , along with the exercise therapy over 3 weeks , would have less pain , higher soft tissue flexibility and improved functional performance compared to the patients who received exercise therapy alone.

Method

Thirty-seven female subjects aged between 20 and 45 years who were referred to Physiotherapy with a Diagnosis of unilateral PFPS participated in this study. Subjects were included if they had anterior knee pain brought on by two (or more) of the following Without traumatic onset: prolonged sitting, stair climbing, descending; running; kneeling; hopping/jumping; Pain on palpation of patellar facets; a step down. Exclusion criteria for this study were:

1. Postoperative patients
2. Osteoarthritis
3. Patellar fracture/injury

Subjects taking analgesic or anti-inflammatory medication were instructed to cease it in order to avoid it's possible effect on intervention. All patients signed a consent form after been informed about the aim of the study.

Subjects were randomised in two groups: Group 1 (experimental group) and Group 2 (controlled group). Both groups received the same muscle strengthening and stretching exercises for 4 weeks. The experimental Group 1 additionally received MWM prior to the exercise program and K-taping at end of the session.

Pain-free MWMs consisted of two techniques in a particular order. The first technique was a medial glide of the patella relative to femur and the second an internal rotation of the tibia relative to the femoral condyles, both applied by the therapist. Simultaneously patient was asked to perform active flexion -extension of the knee in a sitting position (knee open kinetic chain movement) and semi-squatting in the standing position (knee closed kinetic chain movement) for both mobilization techniques. Mulligan techniques were performed in Group 1, each MWM was implemented in 3 sets of 10 repetition, with interval of 30 seconds between each set, 3 sessions a week for 4 weeks.

The exercise program consisted of stretching of hamstring and quadriceps muscles, iliotibial band/ tensor fascia lata (ITB/TFL) complex. Gradually progressive isometric and isotonic exercises for quadriceps, hip adductors these strengthening exercises were performed in 3 sets of 10 repetition.

For the application of K-taping The knee should be completely relaxed and a foam roller or rolled up towel under the knee. Then one strip of tape is applied under the patella with close to maximal tension. Another strip of tape is split in the middle until around 3-4 cm from the top which leaves the anchor intact. Then anchor is to be applied proximally to the patella this leaves then room to wrap the two tails around the patella. The medial tape is going down around the patella and anchor it laterally on the tibia. The lateral tape is going to go down around the patella laterally with aim to translate the patella, medially to offload the patellofemoral joint.

Visual analogue scale was used to measure the intensity of knee at rest and on activity. Whereas examination of ROM is taken by goniometer. For muscle performance MMT was done. Similarly for examination of Q angle patient is ask to lay down in supine the then imaginary line were drawn from ASIS to centre of patella and from centre of Patella to tibial tuberosity and this angle of intersection is measured by goniometer.

Statistical Analysis: The data were Expressed as mean values and their standard Deviation (SD). The variables were analysed By two-way analysis of variance (ANOVA). In this study, descriptive statistics such as bar diagrams, and percentages were used to statistically assess the acquired data. The statistical significance level was set at t-test at $p < 0.0001$.

Results

1. Pain assessment

Table 1: Pain Assessment

Pre	Mean	SD	p-value
On Rest	0.9444	0.9376	0.0114
On Activity	4.8889	1.491	0.0170
Post			
ON Rest	0.2777	0.4609	<0.0001
On Activity	2.6667	0.8402	0.0012

Interpretation: We may conclude from Graph 1 and Table 1 that the severity of pain on activity in Group 1 is much lower than in Group 2.Group 1 had mean reduction of 2.667+-0.8402. whereas Group 2 had mean pain reduction of 3.833+-1.043. The p-value is <0.0001 regarded as highly significant.

2. Range of motion

Table 2: Range of motion

Pre	Mean	SD	p-value
Flexion	134.444	3.258	>0.10
Extension	132.67	3.678	0.0487
Post			
Flexion	136.3889	1.720	0.0003
Extension	135.50	2.333	0.0045

Interpretation: From the above Graph 2 and Table 2 we can interpret that range of motion at knee joint is significantly increased in Group 1 if compared with Group 2. also the p-value is very significant.

3. MMT

Table 3: Manual muscle test

Pre	MEAN	SD	p-value
Quadriceps	3.444	0.5113	<0.0001
Hamstring	3.778	0.6468	0.0001
Post			
Quadriceps	4.222	0.4278	<0.0001
Hamstring	4.389	0.5016	<0.0001

Interpretation: From graph 3 and table 3 we can interpret that in Group 1 muscle power is significantly improved as compared to Group 2. Group 1showed increased muscle power with quadriceps mean 4.222+-0.4278 and hamstring mean 4.389+-0.5016 while in Group 2 mean quadriceps 3.722+-0.4609 and hamstring mean 4.222+-0.5483.

4. Q Angle

Table 4: Q angle.

Q angle	Mean	SD	P value
Pre	22.222	1.478	0.0028
Post	21.500	1.043	0.0002

Interpretation: From Graph 4 and Table 4 we can interpret that in Group 1 Q-angle is significantly reduced as compared to Group 2. Group 1 showed reduction in Q-angle with mean 21.500+-1.043 while in Group 2 mean 22.000+0.8402.the p-value is 0.287 is regarded as significant.

5. Postural assessment

Table 5: Postural Assessment

Alta	Group 1	Group 2
Alta present	12	12
Alta present	4	11
Alta recovered	8	1

Interpretation: from Graph 5 we can interpret that patella alta is recovered in Group 1 with 66 percentage.

Discussion

In general, the major goal of this study was to determine the effect of realignment training (K-taping and mobilization with movement) by improving functional mobility and relief of pain. Both groups were effective in correction of patellofemoral pain syndrome and realignment training proved more efficacious. In the present study, it was found that majority of subjects experienced chronic insidious anterior knee pain. Also, the present study signifies that ROM, pain, muscle power, Q-angle and misaligned patella showed combined improvement which interprets the fact that malalignment of patella might because of weak vastus medialis oblique muscle. Over the course of treatment, there was a significant reduction in pain intensity in both groups.

Treatment protocol was in various phases and used a symptom specific approach, which is lacking in group 2, which might be a responsible factor for a more marked improvement in group 1. Additionally, there is no published study that specifically focuses on realignment training in patient with patellofemoral pain syndrome. In last few years, several studies have demonstrated different results regarding the effect of physiotherapy treatments in management of patellofemoral pain syndrome. Early physiotherapy interventions are a valuable treatment option. Treatments that are easily accessible, low cost-effective, and reversible should be given priority. Traditional physiotherapy programs focus on strengthening of quadriceps especially vastus medialis to improve patellar tracking[11,12]. The purpose of exercise treatment is to help the patella stay in the right position during movement as well as to decrease related pain associated with movement when patella is in the wrong track and position by proprioceptive neuromuscular assistance[13]. In general, PFPS treatments concentrate on the patellofemoral joint and include strengthening of the vastus medialis oblique (VMO), taping, soft tissue mobilization, and patellar mobilization[12]. Exercising programs require between 3-6 weeks or more to achieve the goal[15].

Various authors have documented the strong hypoalgesic reaction to mobilization[15].Two studies have shown decreased patellar mobility within PFPS patients. Witvrouw (2000) reported that medial and lateral patellar mobilization were beneficial in PFPS but the findings were not significant[15]. On the other hand, regarding to my treatment result, patellar mobilization was effective at reducing pain and restoring the patellofemoral joint functional within 1 to 3 sessions in a week. The theory underlying

Mulligan's MWM is that 'when a joint is injured or strained, minor positional faults occur, which result in limitation of movement and/or pain'. Mulligan also stated that pain may subside and range of motion may be increased, if such a joint is forced to be actively moved from a 'correct position'[8]. We assume motor control theory as the most appropriate mechanism for improvements in outcome measures of PFPS patients, treated with functional kinesiotherapy (MWM) and functional therapeutic exercise. However, since exercises, in the present study, were used in conjunction with realignment training, it remains unknown whether pain and functionality could be improved in a short amount of time, if the intervention program contained only exercises. Our decision to perform MWM prior to different types of exercise and K-taping at end of session was based on the fact that exercises alone, as demonstrated by previous studies, provided pain relief in PFPS patients in no more than 6 weeks after initiation of treatment[8].

In a study by Osorio et al. (2013) 20 patients with active PFPS were found to improve perceived pain. Osorio noted a reduction in pain following the application of both Spider and McConnell techniques versus the baseline; however, there was a greater decrease in pain after applying the Spider technique. Presumably the reason for this difference is that the latter type of bandage (Spider) covers a larger area on the knee than the McConnel technique. Moreover, Osorio et al. (2013) noticed an increase in isokinetic quadriceps strength after applying both Spider & McConnel techniques compared to the baseline, but found no difference between the two. Chen et al. (2008) demonstrated the efficacy of KT, which improved patellar pain and stability in 15 women diagnosed with PFPS compared with a control group of 10 healthy women; it was thought that the quadriceps muscle was activated earlier in the KT group than in the no tape group, in addition there were no differences found between the placebo and the no tape group. Finally, Chen et al. (2008) also found there was decrease in pain after application of KT. KT in addition has advantage not only on the knee pain caused by PFPS. Osterhues (2004), in a study of a case of patellar dislocation, observed that the use of KT increased quadriceps muscle activity and joint stability during functional activities.

There are some attainable reasons why K-taping improved the flexibility soft tissues sooner than the control group in the present study. Within the taped area the K-taping increased blood circulation, which could affect the muscle and myofascia functions after kinesio taping. The application of kinesio tape might stretch the skin by applying pressure to the skin and this external load might stimulate cutaneous mechanoreceptors, causing physiological changes and increased flexibility of soft tissues in the taped area.

Numerous studies of Kinesio taping and MWM are done on knee condition such as anterior knee pain but there is no such study focusing on realignment of the patella for PFPS by using K-taping and MWM as component of realignment training protocol. The present study showed realignment training with exercise exceed the exercise therapy in patients with PFPS in four-week therapy. The main finding of the present study revealed immediate and significant pain and functional improvements in patients with PFPS following one week of realignment training. Further research is needed to follow up the long-term effect of realignment training protocol, either individually or in conjunction with therapeutic exercise, in PFPS patients and to investigate possible mechanism of action.

Conclusion

This Is a cross sectional study comparing effect of realignment training and the conventional treatment protocol in PFPS on 37 total subjects. We found that realignment training showed significant improvement in the outcome variable concluding that it improves functional ability and reduce pain. It can be further concluded that Conventional treatment can be more efficacious if combined with realignment training.

Limitations

- Since the study group size was small, study results cannot be generalized for the entire population. The limitations faced were because of the shorter duration for study.

- limited to one geographical location.

- More appropriate method is needed to assess and evaluate the patella alta.

Suggestions and recommendations:

- This study can be performed on a larger population.

- This study can be made more precise with more details.

- Further research is needed to investigate the long-term effect of realignment training.

- This study can be further taken up for further research so that we can properly assess the subjects and find out the efficacy of realignment training on PFPS and new method to assess and evaluate the patella alta is needed.

- Above mentioned suggestions and recommendations can be considered for future research

Conflict of Interest: Nil

Source of funding: Self

Ethical Clearance: Study approved by Instotitional Ethics Committee of Krishna Institute Of Medical Sciences, Karad

Reference

1. Akbas E, Ahmet AT, Yuksel I. The effects of additional kinesio taping over exercise in the treatment of patellofemoral pain syndrome. Acta orthopaedica et traumatologica turcica. 2011 Jan 1;45(5):335-41.

2. Coburn SL, Barton CJ, Filbay SR, Hart HF, Rathleff MS, Crossley KM. Quality of life in individuals with patellofemoral pain: a systematic review including meta-analysis. Physical Therapy in Sport. 2018 Sep 1;33:96-108.

3. Thomeé R, Augustsson J, Karlsson J. Patellofemoral pain syndrome. Sports medicine. 1999 Oct;28(4):245-62.

4. Aminaka N, Gribble PA. A systematic review of the effects of therapeutic taping on patellofemoral pain syndrome. Journal of Athletic training. 2005 Oct;40(4):341.

5. Ng GY, Zhang AQ, Li CK. Biofeedback exercise improved the EMG activity ratio of the medial and lateral vasti muscles in subjects with patellofemoral pain syndrome. Journal of electromyography and kinesiology. 2008 Feb 1;18(1):128-33.

6. Lee JH, Jang KM, Kim E, Rhim HC, Kim HD. Effects of static and dynamic stretching with strengthening exercises in patients with patellofemoral pain who have inflexible hamstrings: a randomized controlled trial. Sports health. 2021 Jan;13(1):49-56.

7. Bhagat CA, Bhura PA. A Comparative Study to Analyse the Prevalance of VMO/VL Muscle Insufficiency in Patellofemoral Pain Syndrome Patients and Healthy Individuals-An EMG Based Study. Indian Journal of Physiotherapy and Occupational Therapy. 2014 Apr 1;8(2):94.

8. Zemadanis K, Sykaras E, Athanasopoulos S, Mandalidis D. Mobilization-with-movement prior to exercise provides early pain and functionality improvements in patients with patellofemoral pain syndrome. International Musculoskeletal Medicine. 2015 Sep 1;37(3):101-7.

9. Lee JH, Jang KM, Kim E, Rhim HC, Kim HD. Static and Dynamic Quadriceps Stretching Exercises in Patients With Patellofemoral Pain: A Randomized Controlled Trial. Sports Health. 2021 Sep;13(5):482-9.

10. Aytar A, Ozunlu N, Surenkok O, Baltacı G, Oztop P, Karatas M. Initial effects of kinesio® taping in patients with patellofemoral pain syndrome: A randomized, double-blind study. Isokinetics and Exercise Science. 2011 Jan 1;19(2):135-42.

11. Wilk KE. Challenging tradition in the treatment of patellofemoral disorders. Journal of Orthopaedic & Sports Physical Therapy. 1998 Nov;28(5):275-6.

12. Powers CM. Rehabilitation of patellofemoral joint disorders: a critical review. Journal of Orthopaedic & Sports Physical Therapy. 1998 Nov;28(5):345-54.

13. Alba-matin P, effectiveness of therapeutic physical exercises in the treatment of PFPS,2018 May 15;26(1):141-53.

14. Juhn MS. Patellofemoral pain syndrome: a review and guidelines for treatment. American family physician. 1999 Nov 1;60(7):2012.

15. Alsulaimani BH. Effectiveness of patellar mobilization in patellofemoral pain syndrome. MOJ Orthop Rheumatol. 2019;11(1):31-3.

Perspective Study of Cervical PAP Smear in Females of at Tertiary Care Hospital Bhopal

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Abstract

Background: Cervical PAP smear examinationis an idealinvestigationfor early detection **of** benign **and malignant conditions of** uterus because cervical infections are commonly encountered problems in women during their reproductive age and in some cases in post-menopausal.

Method: Out of 3980 female patients aged between 21 to 80 years 3910 (98.2%) patients had pathological significance. Cervical smear were prepared by using disposable ayle's spatula fixed in 95% of alcohol and stained by conventional PAP techniques and interpreted according to guidelines of 2001 Bethesda system.

Results: 1800 (46%) ASCUS, 230 (5.88%) AGUS, 500 (12.7%) LSIL, 480 (12.2%) HSIL, 650 (16.6%) SCC, 200 (5.11%) malignant positive, 50 (1.27%) adeno carcinoma were studied 700 (38.8%) chronic cervicitis in ASCUS, 112 (48.6%) chronic cervicitis in AGUS, 298 (59.6%) chronic cervicitis, 98 (19.6%) Decubitis ulcer in LSIL, 60 (12.5%) reparative change, 120 (25%) chronic cervicitis, 120 (25%) chronic cervicitis, 120 (25%) micro INV CA, 120 (25%) CIN were observed in HSIL 630 (96.9%) SSC, 20 (3.07%) adenocarcinoma in SCC study and 50 (1.27%) were studied.

Conclusion: The PAP smear will be a tool for screening of cervical intra epithelial lesion and it is cost-effective, useful for pathologist OBG and Gynaecologist and oncology surgeon to treat such patients to avoid morbidity and mortality.

Keywords: Punch Biopsy, Areys spatula, Bethesda system, Hysterectomy system

Introduction

Cervical carcinoma is an important cause of morbidity and mortality among females globally with the effective implementation of screening procedure, awareness programme, education, improved quality of living has been drastically decreased in developing countries, however it is still one of the common neoplasms in under developed and developing countries. In India it is one of the most common neoplasm in females with the incidence of 14.42/100,000 population and mortality rate of 2.83 / 100,000 population[1]. Cervical epithelium presents a spectrum of cervical intra-epithelial neoplasm (CIN) changes as precancerous state. Most

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cervical cancers can be detected as pre invasive state with an adequate cytological screening and treated appropriately thus preventing overt progression of the lesion to full blown cancer and in turn decreasing morbidity and mortality.[2][3] with effectiveness of the Papanicolaou(PAP) cytological test in early detection of pre-cancerous state and accessibility to cervical biopsy the mortality rate due to carcinoma of cervix has declined statistically.[4]

The present study is planned to evaluate the usefulness of cervical cytology by PAP smear in detecting and classifying different non-neoplastic, pre-neoplastic and neo-plastic lesion of cervix and to correlate the PAP smear cytology with histo-pathological findings.

Material and Method

3980 female patients aged between 21-80 years who regularly visited to Chirayu Medical College and Hospital OBGY OPD were studied.

Inclusive Criteria: All the patients referred from Obstetrics and Gynaecology department for cervical PAP smear test were selected for study.

Exclusion Criteria: The women previously treated for CIN, cervical intra-epithelial Neoplasm and HIV infected patients were excluded from the study.

Method

Out of 3980 cervical smear 3910 patients had pathological significant cervical smear were prepared by using disposable ayre's spatula fixed in 95% of alcohol and stained by conventional PAP techniques and interpreted according to the guidelines of 2001 Bethesda system fifty (50) histo-pathological correlations of pre-invasive and invasive lesion corresponding cervical biopsy (punch biopsy and hysterectomy specimen) slides were studied. Clinical history of each patients were recorded.

Durationof study was August-2021 to August-2022

Statistical analysis: Various parameters of cervical PAP smear were classified with percentage statistical analysis was carried out in SPSS software.

Observation and Results

Table 1: study of cervical PAP smear different age groups

ASCUS – 90 patients in age group between 21-30, 480 between 31-40, 840 between 41-50, 170 between 51-60, 130 between 61-70, 90 between 71-80 (Total diagnosed cases were 1800)

AGUS – 90 cases between 31-40 years, 90 between 41-50, 50 between 51-60 (Totally diagnosed cases were 230)

LSIL – 50 cases between 21-30, 200 between 31-40, 150 between 41-50, 100 between 51-60 (Total diagnosed cases were 500)

HSIL – 50 cases aged between 21-30, 100 between 31-40, 140 between 41-50, 90 between 51-60, 50 between 61-70, 50 between 71-80 (Total diagnosed cases were 480)

SCC – 120 cases aged between 31-40, 90 between 41-50, 260 between 51-60, 180 between 61-70 (Total diagnosed cases were 650)

Adeno carcinoma – 50 aged between 71-80 years

Table 2: Correlation of PAP smear and cervical biopsy histopathology out of 1800

➤ ASCUS 700 (38%) had chronic cervicitis, 1100 (61.1%) Normal Cervix were observed.

➤ In 230 AGUS 112 (48.6%) chronic cervicitis, 118 (51.3%) had Normal Cervix 500 LSIL, 298 (59.6%) had chronic cervicitis, 104 (20.8%) Normal Cervix, 98 (19.6%) Decubitus ulcer

➤ In 480 HSIL patients 60 (12.5%) had reparative change, 120 (25%) had chronic cervicitis, 120 (25%) had micro INV CA, 120 (25%) had CIN, 60 (12.5%) Normal Cervix

➤ In 650 SCC patients 630 (96.9%0 had SSC, 20(3.07) had adeno carcinoma,

➤ 50 (100%) adeno-carcinoma were reported

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Discussion

Present prospective study of cervical PAP smear **of patients at tertiary care centre** – 1153 (46%) ASCUS, 126 (5.88%) AGUS, 566 (12.7%) LSIL, 330 (12.2%) HSIL, 197 (16.6%) SCC, 138 (5.11%) malignant positive, 35 (1.27%) adeno carcinoma, infectious tb 220, 377-candiasis, 764 nilm (Table-1). In correlative study of PAP smear and cervical biopsy 700 (38.8%) ASCUS had chronic cervicitis, 112 (48.6%) AGUS had chronic cervicitis, 298 (59.6%) chronic cervicitis, 98 (19.6%) decubitus ulcer was observed in LSIL, 60 (12.5%) Reparative changes 120 (25%) chronic cervicitis, 120 (25%) micro INV CA, 120 (25%) CIN were observed in HSIL, 630 (96.9%) SSC, 20% adeno carcinoma in SCC and 50 (1.27%) adeno carcinoma was confirmed (Table-2). These findings are more or less in agreement with previous studies [5][6][7].

Prevalence of abnormal tissue inflammation (dysplasia) is often associated with multi-**parity** or parity women[8]. Women exposure to sexual intercourse at early age is at greater risk of dysplasia. Hence ideal age for first coitus must be 22-23 years[9]. It is reported that, Muslim women are less prone for any cervical infection or cancers as compared to non-Muslim women because Muslim men are circumcised and carry least infection during coitus[10].

Majority of the women studied in the present study belonged to middle socio-economic status and were un-aware of hygiene, during mensesthey used dirty clothing leading to risk of infections.

LSIL (low grade squamous intra epithelial lesion)

is associated with intra-menstrual and post-coital bleeding and HSIL (High grade squamous intra-epithelial Lesion) is observed in post-menopausal which is treated as bad sign because it is the indication of cervical cancer. However cervicitis is the most common finding in PAP smear in reproductive women [11]. Various screening test for cervical PAP smear liquid PAP cytology automated cervical screening techniques Lugol's Iodine and acetic acid application, speculoscopy,cervicography can be used for early detection of pre-malignant lesion.

Summary and Conclusion

Present study of cervical PAP smearat a tertiary care hospital. The cervical PAP smear screening for early detection of pre-malignant and malignant lesion of cervix. As it is cost-effective and affordable to middle socio-economic population also, but this study demands further genetic, environment, nutritional, patho-physiological, and hormonalstudy because exact pathogenesis of cervical cancer is still un-clear.

Limitation of study – Due to tertiary location of research centre, small number of patients and lack of latest techniques we have limited findings and results.

- This research paper was approved by Ethical committee of Chirayu Medical College and hospital Bhopal MP – 462030.
- No Conflict of Interest
- No Funding

Table 1: Study of cervical PAP smears in different age groups

No. of Patients: 3910

Diagnosis	21-30	31-40	41-50	51-60	61-70	71-80	Total (%)
ASCUS	09	269	540	170	85	80	1153 (46%)
AGUS	05	30	48	20	15	8	126 (5.88%)
LSIL	26	185	196	79	32	48	566 (12.7%)
HSIL	12	78	106	85	35	14	330 (12.2%)

Diagnosis	21-30	31-40	41-50	51-60	61-70	71-80	Total (%)
SCC	--	31	52	58	47	09	197 (16.6%)
Malignant positive --	--	16	31	35	42	14	138 (5.11%)
Adeno carcinoma	--	4	8	7	15	1	35 (1.27%)
I NFECTIOUS ETIOLOGY 1-TB	25	83	25	39	32	16	220
2 CANDIDIASIS	46	98	88	81	45	18	377
NILM	67	196	266	146	+	32	769
Total	190	990	1360	720	410	240	3910

ASCUS = Atypical squamous cell of undermine significance

AGUS = Atypical glandular cell of undermined significance

LSIL = Low grade squamous Intraepithelial Lesion

HSIL = High grade squamous Intraepithelial lesion

SCC = Squamous cell carcinoma

Table 2: Correlation of PAP smear and cervical biopsy histopathology

PAP smear	Number	Histopathology	Number with percentage (%)
ASCUS	1153	Chronic cervicitis	700 (38.8%)
		Normal Cervix	463(61.1%)
AGUS	126	Chronic cervicitis	112 (48.6%)
		Normal Cervix	118 (51.3%)
LSIL	566	Chronic cervicitis	298 (59.6%)
		Normal Cervix	104 (20.8%)
		Decubitus ulcer	98 (19.6%)
HSIL	330	Reparative Change	60 (12.5%)
		Chronic cervicitis	120 (25%)
		Micro INV CA	120 (25%)
		CIN	120 (25%)
		Normal Cervix	60 (12.5%)
SCC	197	SSC	630 (96.9%)
		Adeno carcinoma	20 (3.07%)
Adeno carcinoma	35	Adeno carcinoma	50 (1.27%)
Infectious tb	220		
candidiasis	377		
nilm	764		

References

1. Park K – Parks text book of preventive and social medicine 21st edition India M.s BanarasidasBhanot 2011, 354.

2. Anderson MC – The aetiology of cervical cancer Female reproductive system of systemic pathology 3rd edition vol. 6 New York Churchill living stone 1991, 76-9.

3. Pradhan B, Pradhan SB – Correlation of PAP smear findings with clinical findings and cervical biopsy Kathmandu univ. Med. J. (KUM) 2007, 5; 461-7.

Khaneta Parveen, Nipun Madhav, Rajesh P Loya et al. / Perspective Study of
Cervical PAP Smear in Females of at Tertiary Care Hospital Bhopal

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4. Yeoh GP, Chan KW – The accuracy of papanicolaou smear predictions cyto-histological correlations of 283 cases Hong Kong Med. J. 1997, 3; 373-376.

5. Tailor HJ, Patel RD – Study of cervical PAP smear in tertiary care hospital of south Gujarat India. Int. J. Res. Med. Sci. 2016, 4; 286-8.

6. Patel MM, Pandya AN – Cervical PAP smear study and its utility in cancer screening to specify the strategy for cancer control Natl. J. community Med. 2011, 2; 48-51.

7. Saha R, Thapa M – Correlation of cervical cytology with cervical histology Kathmandu univ. Med. J. 2005, 3; 222-4.

8. Gopikrishna C, Murthy NS – Increased human papilloma infection with increased number of pregnancies in Indian women J. infect D, J 1995, 171; 254-55.

9. Iuthra K, Prabhakar K –Natural history of pre-cancerous and early cancerous lesion of the uterine cervix Acta cytol. 1987, 31 (3); 226-34.

10. Wyinder EL, Comified J – A study of environments factors in carcinoma of cervix Am. J. obstret. Gynaecol. 1954, 68; 1016-1052

11. Shankar Narayan R – Elective screening programmes for cervical cancer in low and middle income developing countries Bulletin of the world Health organisation 2011, 79; 954-62.

Study on Awareness of Consumers about Transfats in Chandigarh

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Abstract

Background: Transfats also infamous as ugly fat is an unsaturated fat which is formed in industries by hydrogenation of monosaturated fat by thermal processing etc in order to make cheaper plant fat look like animal fat .Though we also have natural transfats which are formed by biotransformation in rumen of animal, they are not so dangerous for our health. Transfats is stated to increase level of LDL and decrease level of HDL thereby causing increase risk of cardiovascular diseases; it is also linked to obesity, dementia in many studies and is emerging as one of the major challenge to public health in 21st century. Various organizations like FSSAI has given guidelines on transfats, WHO has committed to remove industrially produced transfats by 2023**.**

Objective: we conducted the study to understand consumer awareness about transfats.

Methods: Study was conducted 15 different grocery shops, questions were asked via interview, schedules .Total N=362. Data was analyzed by comparing on basis of gender, educational level.

Results: 60.8% of participants said they look for food label in packaged food , 74.3% were found aware about harmful effects of transfats , 30.4% said they are aware about fssai limit for transfats, Only 63.3% graduate & above , 33.3% above matriculation and 13.3 % below matriculation consumers said they look for food label**.**

Conclusion: The study found out that many educated people also lack awareness about transfers and a very few percentage of people were found aware about fssai limit for transfats.

Keywords: transfats, cardiovascular disease, consumer, obesity, packaged.

Introduction

Transfats also infamous as ugly fat is an unsaturated fat which is formed in industries by hydrogenation of monosaturated fat by thermal processing etc in order to make cheaper plant fat look like animal fat. Though, we also have natural transfats which are formed by biotransformation in rumen of animal, they are not so dangerous for our health. Denmark was the first country to eliminate transfats in 2004. Transfats are stated to increase level of LDL and decrease level of HDL thereby causing increase risk of cardiovascular diseases; it is also linked to obesity, dementia in many studies and emerging as

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one of the major challenge to public health in 21st century. SDG goal no. 3 talks about maintenance of good health also various organizations like FSSAI has given guidelines on transfats. WHO has committed to remove industrially produced transfats by 2023.[1] FSSAI has made commitment of reducing percentage of transfats by 5 percent, also they sought for mandatory declaration of quantity of transfats on product label. **ISSUES** sometimes transfats information is not mentioned. Many a time's simply hydrogenated oil is mentioned. WHO has released REPLACE – step by step guide to eliminate industrially produced transfats.

Examples in Indian Market: margarine, spread, artificial butter, Dalda, Vanaspati oil.

Material and Methods

Study Area: Chandigarh is a city, district and union territory in India that serves as the capital of the two neighbouring states of Punjab and Haryana.

Study Units: 15 grocery shops , Chandigarh.

Study Design: A Cross-sectional observational community based study.

Study Tool: Pre-Structured Questionnaire developed for the Study.

Sampling Technique: Convenient sampling

Sample Size:: Optimum sample size on proposed study is calculated on basis of anticipated 62 % awareness among community observed in "a cross sectional study to assess the awareness of the presence of transfat in packaged food items and their harmful effects in a metropolitan city of central India"(R bonsai and s. Kumar) on the basis of 95% confidence level and 5% relative precision optimum

size sample size comes 362. The questionnaire was reviewed by dietician for content and face validity. Minor adjustments were made and a copy of the questionnaire is available from corresponding author upon request.

Data collection tool –Data was collected with the help of questionnaire.

Data analysis tool –Data was analyzed with the help of Microsoft excel and SPSS version 20 for windows of (IBM Corp. Armonk, New York, USA)

Study Period: Jan 2022-june 2022

Inclusion criteria: Those consumers who gave consent for participation in study.

Exclusion criteria: Those consumers who do not give consent to be participant in the study, semifilled questionnaire.

A pilot study was conducted on 15 April 2022 on 10 subjects to test the questionnaire framed for the study. The relevant changes were made in the questionnaire.

Data were analyzed using descriptive statistics including frequency distribute-

Tin and inferential statistics. Chi- square test was performed to test the statistical significance.

Results

40.9% of respondents have knowledge about transfats, 60.8% of participants said they look for food label in packaged food, 77.4% were found aware about harmful effects of transfats, 30.4% said they are aware about FSSAI limit for transfats.

Table 1: Responses of Customers in the Questionnarie.[23]

		Responses		Percent of Cases
		N	Percent	
knowledge transfats	DO YOU KNOW ABOUT TRANSFATS?	148	8.0%	40.9%
	ARE INDUSTRIAL PRODUCED TRANSFATS HAZARDOUS?	195	10.5%	53.9%
	DO YOU CHECK LABEL ON PARTIALLY HYDROGENATED VEGETABLE OILS?	265	14.2%	73.2%
	DO YOU KNOW ABOUT REPLACE INITIATIVE TAKEN BY WHO?	248	13.3%	68.5%
	DO YOU CHECK LABEL ON PACKAGED PRODUCTS?	220	11.8%	60.8%
	DO YOU KNOW ABOUT PARTIALLY HYDROGENATED VEGETABLE OILS?	197	10.6%	54.4%
	DO YOU KNOW ABOUT FSSAI LIMIT OF TRANSFAT?	110	5.9%	30.4%
	IS THERE ANY DIFFERENCE BETWEEN NATURAL AND ARTIFICIAL PRODUCED TRANSFATS	252	13.5%	69.6%
	DO YOU KNOW REUSED OIL IN SWEET SHOPS HARMFUL FOR OUR BODY?	226	12.1%	62.4%

Table 2: Chi-Square Test to Check Relation between Education and Knowledge about Transfats.

Count															
		Scored values for knowledge													Total
		1.00	2.00	3.00	4.00	5.00	6.00	7.00	8.00	9.00	10.00	11.00	12.00	13.00	
Education	Graduate	2	12	26	30	49	44	27	15	13	4	1	0	0	223
	Postgraduate	0	5	5	17	35	46	15	10	1	2	1	1	1	139
Total		2	17	31	47	84	90	42	25	14	6	2	1	1	362

Chi-Square Tests			
	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	24.278[a]	12	.019
Likelihood Ratio	27.826	12	.006
Linear-by-Linear Association	1.957	1	.162
N of Valid Cases	362		

Discussion

The study was conducted to access the knowledge of consumers regarding transfats .similar studies have been conducted in different regions too. In the year 2006 a study was conducted titled " Americans awareness, knowledge and behavior regarding fats" by Excel and penny in which it was found that majority of respondents (62%) report that they were concerned with both the amount and type of fat they consume. [13] Later in the year 2010 a study titled " effect of nutrition education on knowledge , attitude and behavior relating to transfats acids in food by Pletzke and Henry (2010) in which it was reinforced that nutrition education session is an option to consumer to understand "why to " make changes.[20] In the same year 2010 another study titled " Transfats sources, heath risks and alternative approach – a review by V Dhaka , N guile ." in which it was stated banning all TFA from the diet would be detrimental as this would include banning transfats which are good for health.[5] In 2016 a study titled "a cross sectional study to assess the awareness of the presence of transfats in packaged food items and their harmful effects in a metropolitan city of central India." the study clearly signifies the importance of knowledge, awareness and consumption behavior among young generation.[21] In the same year 2016 another study titled " level of nutrition knowledge and its association with fat consumption among college students ." by N Yahiya and Carrie was conducted, which magnifies the role of nutrition education as a potential tool in health campaign to promote healthy eating patterns among college students.[22] In the recent study titled "knowledge, awareness and practices among consumers regarding transfats: A cross sectional study by P khanna and S Goel (2021). Suggested strict monitoring of marketing methods and package food labels can be recommended for providing reliable information.[23]

These all studies show lack of knowledge and awareness among different populations regarding transfats. In our study 60.8% of participants said they look for food label in packaged food , 74.3% were found aware about harmful effects of transfats , 30.4% said they are aware about FSSAI limit for transfats . On performing chi-square test to check the relation between education level and knowledge about transfats, it was $p < 0.05$, which shows significant relationship between level of education and knowledge about transfats. Lack of awareness would lead to wrong choices of food and will lead to surge in cases of non communicable diseases in future.
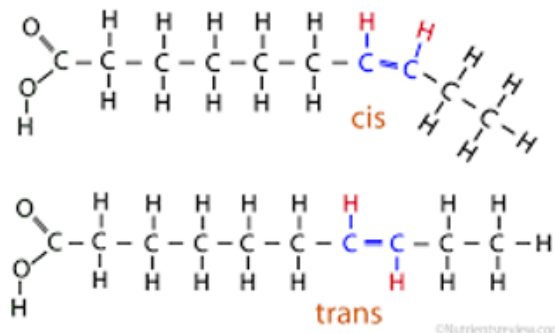
Figure: Difference between cis-fats and transfats. [24]

Conclusion

Since the study found out that many educated people also lack awareness about transfats and a very few percentage of people were found aware about FSSAI limit for transfats and a significant relation is found between level of education and knowledge of transfats. There is a need for the increased awareness campaign among consumers so that they can make healthier choices for themselves and prevent non communicable diseases in future.

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Conflict of Interest: NIL

Ethical Consideration: Informed consent form was signed by each participant.

References

1. WHO Plan to Eliminate Industrially Produced Transfats Acids from Global Food Supply; 2018. 1. [Last accessed on 2021 Oct 01].

2. A, Erin H. Formulation of Tran's free margarines using hydrogenated and interesterified palm Olean. J Oil Palm Res 2011; 23:1153-8.

3. Te Maringa L, Montez JM. Health effects of saturated and translate acid intake in children and adolescents: Systematic review and met analysis. Plops One 2017; 12:e0186672. 5. Raj MA, Reddy AG, Reddy AR,

Adilaxmamma K. Effect of dietary Vanaspati alone and in combination with stressors on serobiochemical profile and immunity in white leghorn layers. Topical Into 2011; 18:314.

4. FDA. Trans Fat; 2018. Available from: https://www. fda.gov/food/ foodadditives petition /transfats. [Last accessed on 2021 Oct 01].

5. Dhaka, Guile N, Halfwit KS, KhatkarBS. Trans fats sources, health risks and alternative approach – A review. J Food Sic Techno 2011; 48:53441.

6. Partial A, Rooms G. The global fight against transfats: The potential role of international trade and law. Global Health 2019; 15:46.

7. Nishida C, Usury R. WHO scientific update on health consequences of Tran's fatty acids: Introduction. Euro J Clan Nut 2009; 63 Supple 2:S14.

8. De Souza RJ, Mentee A, Marlene A, Coma AI, Ha V, Kishinev T, et al. Intake of saturated and Tran's unsaturated fatty acids and risk of all cause mortality, cardiovascular disease, and type 2 diabetes: Systematic review and met analysis of observational studies. BMJ 2015; 351:h3978.

9. Downs SM, Thaw AM, GhoshJerath S, McCabe J, Reddy KS, Leader SR. From Denmark to Delhi: The multispectral challenge of regulating Trans fats in India. Public Health Nut 2013; 16:227380.

10. Asteroid A, Willett WC. Health effects of Trans fatty acids. Am J Clan Nut 1997; 66:1006S10S.

11. Irbil MP. Tran's fatty acids – A risk factor for cardiovascular disease. Pak J Med Sic 2014; 30:1947.

12. Bandera R, Gotha S, Dixit S, Arose S. A cross-sectional study to assess the awareness of the presence of transfats in packaged food items and their harmful effects in a metropolitan city of central India. Into J Med Sic Public Health 2016; 5:1.

13. Excel RH, KrisEtherton P, Lichtenstein AH, WylieRosett J, Groom A, Tetzel KF, et al. Americans' awareness, knowledge, and behaviors regarding fats: 20062007. J Am Diet Assoc 2009; 109:28896.

14. Asti S, Kovacs S. Use of Tran's fat information on food labels and its determinants in a multiethnic college student population. J Nut Educe Behave 2010; 42:30714.

15. FSSAI. FSSAI Slashes Limit for Trans Fat Levels in Foods; 2021. Available from: https://www.thehindu. com/scitech/health/fssaislashes-limit-for-trans-fat-levels-in-foods/article33486031.ece. [Last accessed on 2021 Oct 01].

16. Labe MR, Stander S, Skiff CM, Ghafoorunissa, Avella M. Approaches to removing Tran's fats from the food supply in industrialized and developing countries. Euro J Clan Nut 2009; 63:S5067.

17. Gogra NJ, Sheath HJ, Maura MR, Beldekas MN, Tate UM. A literature review of consent declines and consent withdrawals in randomized controlled trials conducted during the COVID19 pandemic. J Post grad Med 2021; 67:1348.

18. HashempourBaltork F, Terabit M, AzadmardDamirchi S, Peter Savage G. Chemical, rheological and nutritional characteristics of sesame and olive oils blended with linseed oil. Adv Pham Bull 2018;8:10713.

19. eckel rah, kris-etherton p, Lichtenstein ah, wylie-rosett j, groom a, stately kef, yin-piazza s. Americans' awareness, knowledge, and behaviors regarding fats: 2006-2007. J is diet assoc. 2009 Feb; 109(2):288-96. Doe: 10.1016/j.jada.2008.10.048. Paid: 19167956.

20. letzke, v., Henry, bow. oozier, add and more, j. (2010), the effect of nutrition education on knowledge, attitude, and behavior relating to trans fatty acids in foods. Family and consumer sciences research journal, 39: 173-183. https://doi.org/10.1111/j.1552-3934.2010.02055.x

21. banseria, rachitic & goshawk, Sunil & dixit, sunray & arose, latish. (2016). a cross-sectional study to assess the awareness of the presence of trans-fat in packaged food items and their harmful effects in a metropolitan city of central India. International journal of medical science and public health. 5. 1. 10.5455/ijmsph.2016.29052016528.

22. yahia, neat & brown, Carrie & replay, Melissa & chug, mea. (2016). level of nutrition knowledge and its association with fat consumption among college students. Bum public health. 16. 1-10. 10.1186/s12889-016-3728-z.

23. khanna p, Goel s, join r, Singh a, Singh mp. Knowledge, awareness, and practices among consumers regarding trans-fat: a cross-sectional study. Indian j community med. 2022 jan-mar; 47(1):107-110. Doe: 10.4103/ijcm.ijcm_1265_21. Pub 2022 mars 16. Paid: 35368489; paced: pmc8971886.

24. https://www.researchgate.net/post/What-is-the-difference-in-cis-and-trans-type-of-fatty-acids-which-one-is-better-and-what-should-be-avoided.

Correlation between BMI and HB with Oxygen Saturation in Medical Students

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Abstract

Background: The bulk of oxygen in blood is normally transported as oxyhemoglobin. The amount of oxyhemoglobin is often expressed as percentage saturation (Spo2).

Objective: Oxygen saturation is one of the vitals monitored in clinical practice and also the most important vital monitored in COVID-19patients since it's the oxygen saturation which gets depleted in these patients. COVID pandemic has taken heavy toll on health and life of the people and since different people respond to COVID-19 differently so the response is multifactorial. The exposure to lower oxygen levels may have important clinical consequences, particularly in physiologic processes like respiratory drive, which are dependent on PO2 in the blood. Hence our aim is to study the effect of BMI and Hb on oxygen saturation (SPO2).

Method: A descriptive cross-sectional study was conducted in Department of Physiology, SKIMS-Medical College. Data was collected by using self-administered questionnaire followed by anthropometric measurement. Body Mass Index (BMI) by Quetelet's index and Haemoglobin (Hb) concentrations by Sahli's method were assessed. Pulse oximetry was done to know the oxygen saturation.

Results: The students with high BMI show negative correlation with oxygen saturation while as Hb with oxygen saturation shows positive correlation. These results have important clinical implications while treating patients with high BMI or low Hb.

Key Words: Body mass index (BMI), Haemoglobin (Hb), Obesity, oxygen saturation (spo2), Qutelet's index.

Introduction

If obesity is associated with even small changes in oxygen saturation, the exposure to lower oxygen levels may have important clinical consequences, particularly in physiologic processes like respiratory drive, which are dependent on PO_2 in the blood, or in situations of marginally sufficient oxygen delivery to important organs like the brain, as can be seen in the elderly. [1] Peripheral capillary oxygen saturation (SpO_2) is commonly measured by pulse oximetry, which provides an indirect measurement of arterial oxygenation (SaO_2) based on the differential absorption of light by oxygenated

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and deoxygenated blood during pulsatile blood flow.[2] Oxygen requirements can be determined using pulse oximetry, instead of arterial blood gas sampling. Pulse oximetry is a technique used to measure oxygen saturation (SpO2) non-invasively. In addition, oxygen saturation is considered as the "fifth vital sign," as discussed in some of the literature and in clinical practice, which is documented in most patients while in the emergency room (ER).[3]

Obesity increases the risk of type 2 diabetes, hypertension, heart disease, stroke, dyslipidemia, osteoarthritis, gynaecological problems, sleep apnoea, and respiratory problems. In addition, studies have reported that obesity has an adverse effect on iron status.[4] Obesity may contribute to adverse outcomes in corona virus disease 2019 (COVID-19). However, studies of large, broadly generalizable patient populations are lacking and the effect of body mass index (BMI) on COVID-19 outcomes— particularly in younger adults—remain uncertain. Obesity has become a well-recognized risk factor for hospitalization and adverse outcomes with COVID-19. [5, 6]

The cause of the iron deficiency of obesity is unclear. Iron deficiency in obese individuals may be a result of low iron intake (due to an unbalanced diet), reduced iron absorption in the small intestine, and greater iron requirements caused by a larger blood volume. In addition, obesity is associated with a chronic low grade inflammation state. For this reason, sequestration of iron through an inflammatory mediated mechanism can be one of the proposed causes of iron deficiency in obesity. [7, 8] Anaemia, itself, does not cause hypoxemia. However, anaemia decreases the total oxygen content in the blood. This effect can be compensated by increasing the cardiac output and oxygen extraction ratio. Therefore, until very low levels of haemoglobin are observed, hypoxemia is not a concern in anaemic patients. [9]

Material and Methods

A descriptive cross-sectional study was conducted in Department of Physiology, SKIMS-Medical College. After explaining the procedure of the study to be conducted, an informed consent was obtained from the students.

Inclusion criteria -Apparently healthy medical students aged between 18 -24 years, non-smokers consenting for study.

Exclusion criteria - Students with any medical problem or on any medication, smokers, not consenting for study.

Data was collected by using self-structured questionnaire based on review of similar studies. The questionnaire contains several anthropometric data included information of age, gender, height and weight. Body Mass Index (BMI) and Haemoglobin concentrations were assessed. Pulse oximetry was done to know the oxygen saturation. The BMI was calculated by Quetelet's index i.e. BMI is weight (kg)/height (m)^2 . BMI was classified in to three groups as per new classification for Asian Indians). [10] Undernourished: <18.0 kg/m^{2}Normal weight: 18-22.9 kg/m^{2}Overweight: 23-24.9 kg/m^{2}Obese: >25 kg/m^2

Haemoglobin was estimated by Sahli's method in haematology lab due to cost effectiveness. Oxygen saturation (SpO$_2$) was estimated by digital pulse oximeter. Pulse oximetry is a relatively simple, feasible, non-invasive and inexpensive method. The team was instructed to avoid measuring oxygen saturation at the fingers with any nail polish or dye, as they can interfere with accurate measurements. Readings for oxygen saturation after 30 s of the pulse oximeter being attached to the subject's fingers were taken. Data entry and analysis was done using Statistical Package for Social Sciences (SPSS). Chi-square was used for categorical data analysis. Pearson correlation coefficient was used to find a correlation between BMI and Hb with SPO2 and a P value of ≤0.05 was regarded as statistically significant.

Results

Table 1: Gender Distribution

Gender	Number	Percentage
Female	66	62.3%
Male	40	37.3%
Total	106	100%

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Table 2: SpP₂ Distribution

SPO₂	M	F	Total
>98	11(27.5%)	9(13.7%)	20 (18.9%)
97-98	19(47.5%)	33(50%)	52(49%)
95-96	9(22.5%)	22(33.3%)	31 (29.3%)
<95	1(2.5%)	2(3%)	3 (2.8%)
Total	40(100%)	66(100%)	106(100%)

Table 3. BMI and Gender Distribution

	BMI Distribution					Hb Distribution				
	<18.5 n/%	18.5-22.9 n/%	23-24.9 n/%	>25 n/%	Total n/%	<10 n/%	10-12.9 n/%	13-14.9 n/%	>/=15 n/%	Total n/%
M	1(2.5)	31(77.5)	7(17.5)	1(2.5)	3(2.8)	3(7.5)	8(20)	13(32.5)	16(40)	40(100)
F	2(3)	47(71.2)	14(21.3)	3(4.5)	78(73.6)	11(16.7)	21(31.8)	30(45.4)	4(6.1)	66(100)
T	3(2.8)	78(73.6)	21(19.9)	4(3.7)	21(19.9)	14(13.2)	29(27.4)	43(40.5)	20(18.9)	106(100)

M-male, F-female, T-total

TABLE 4. BMI AND SPO2

	<95	95-96	97-98	>98	Total	Pearsons
<18.5	1(25%)	2(6.4%)	1(1.9%)	0(0%)	4(3.8%)	Chi-Square=
18.5-22.9	0(0%)	12(38.7%)	46(90.2%)	20(100%)	78(73.6%)	100.351
23-24.9	0(0%)	16(51.6%)	4(7.9%)	0(0%)	20(18.8%)	P=0.000 (<0.005)
>25	3(75%)	1(3.3%)	0(0%)	0(0%)	4(3.8%)	Statistically
T0TAL	4(100%)	31(100%)	51(100%)	20(100%)	106(100%)	Significant

Table 5. Hb And SPO2

	<95	95-96	97-98	>98	Total	Pearsons
<10	4(100%)	9(29%)	0(0%)	1(5%)	14(13.3%)	Chi-Square =
10-12	0(0%)	9(29%)	13(25.5%)	2(10%)	24(22.6%)	54.236
13-15	0(0%)	12(38.7%)	30(58.8%)	9(45%)	51(48.1%)	P=0.000 (<0.05)
>15	0(0%)	1(3.3%)	8(15.7%)	8(40%)	17(4.6%)	Statistically
Total	4(100%)	31(100%)	51(100%)	20(100%)	106(100%)	Significant

Discussion

This study is a cross sectional descriptive study based on self- structured questionnaire, where we assessed correlation of BMI and Hb with SPO2 in undergraduate medical students. Obesity continue to increase substantially worldwide, affecting all ages, sexes and races, also becoming serious problem in India despite the widespread presence of under nutrition. [11] Our study showed that out of 106(100%) students more females (25.75%) were overweight or obese with BMI of 25 than males (20%).There are gender differences in carbohydrate metabolism that cause a greater increase in triglyceride levels in women. Therefore, the increased refined carbohydrate intake in developing countries may affect excess weight gain in women more than in men.[12]

Females with Hb concentration of <10gm% are more (16.7%) than males (7.5%).The sex difference

in mean venous haemoglobin levels and red cell mass is generally considered to be caused by a direct stimulatory effect of androgen in men in the bone marrow in association with erythropoietin, a stimulatory effect of androgen on erythropoietin production in the kidney, and an inhibitory effect of oestrogen on the bone marrow in women .[13,14] Oxygen saturation (SPO2) of 49% students were 97-98%, 18.9% were >98%,29.3% were 95-96 and 2.8% were <95%.

Relation between BMI and SPO2 in table 4 shows that subjects with BMI of <18.5 and >25 have SPO2 <95% which means that underweight and overweight both have decreased oxygen saturation as compared to subjects with BMI between 18.5-24.9, also subjects with BMI of 23-24.9(overweight) have SPO2 between 95-96%. Hence relation between BMI and SPO2 is inverse and statistically significant with Pearsons Chi-square=100.35 and pvalue=0. 000. Also relation between Hb and SPO2 in table 5 shows that subjects with Hb <10gm% have SPO2<95% while as subjects with Hb >15 have SPO2 levels between 97-98% in 15.7% and SPO2>98% in 40% students. Hence Hb and SPO2 are positively correlated and statistically significant with pvalue=o.ooo and Pearsons Chi-square=54.236.

Our study shows that high BMI is negatively correlated with SPO2 and the correlation is statistically significant. Total body oxygen consumption is increased as a result of an expanded lean tissue mass as well as the oxidative demands of metabolically active adipose tissues. The association of alveolar hypoventilation with obesity is also well known.[15] Similar studies were conducted by Monica Linea Vold et al which showed that low FEV1, smoking history, and obesity are factors associated with oxygen saturation decrease in an adult population cohort.[16] A study by Vishesh K Kapur et al. also showed that obesity is associated with a Lower Resting Oxygen Saturation in the Ambulatory Elderly.[17]

In our study, Hb concentration and SPO2 are positively correlated with p value of 0.000 (<0.005), which is statistically significant. The blood hemoglobin concentration is determinant of oxygen delivery. In anemic patients, oxygen delivery decreases and oxygen extraction is increased. This leads to decreased venous hemoglobin saturation and lower tissue oxygen saturation. The rate of tissue deoxygenation during ischemia is dependent on oxygen consumption and on the amount of oxygen available in the tissue.[18] Similar studies were conducted by Farhatul Inayah Adiputri and et al showed that there is a weak negative correlation between oxygen saturation and hematocrite levels.[19]

In patients with COPD, besides a V/Q mismatch, the low oxygen content due to anemia may play a role in deterioration, and oxygenation and compensatory mechanisms may not be sufficient to overcome the effects. As a result, anemic patients with COPD may have more indications for long-term oxygen therapy (LTOT) than those without anemia. The significance of low hemoglobin (Hb) levels in terms of LTOT indications has not been determined for patients with COPD. Ausk and coworker showed that increasing BMI is associated with higher serum ferritin levels and lower serum levels of iron and transferrin saturation.[20]

Conclusion

BMI and SPO2 are negatively correlated are the correlation is statistically significant while as Hb and SPO2 are positively correlated and the correlation is statistically significant.

Limitations: The study is a descriptive study with statistically significant results however; there were some limitations in our study. First, the subject number was small in the groups and we did not use the ABGs or mixed venous oxygen for checking oxygen saturation but only pulse oximetry due to invasive nature, risk, and cost of these investigations.

Conflict of Intrest: NIL

Ethecal Clearance: IEC of SKIMS-MC

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Refrences

1. Carlson BW, Neelon VJ, Carlson JR, Hartman M, Bliwise DL. Cerebral oxygenation in wake and during sleep and its relationship to cognitive function in community-dwelling older adults without sleep disordered breathing. J Gentol A Biol Sci 2011; 66(1):150-156.)

2. Kacmarek RK, Stoller JK, Heuer AJ. Egan's Fundamentals of Respiratory Care. 10th. Mosby; 2012. Analysis and Monitoring of Gas Exchange; p- 398.

3. Mower WR, Myers G, Nicklin EL, et al. Pulse oximetry as a fifth vital sign in emergency geriatric assessment. Acad Emerg Med 1998; 5:858-65.

4. Brynat R, Dundes L. Fast food perception: A pilot study of college students in Spain and United State. Apetite. 2008;51(2):327-30

5. Tartof SY, Qian L, Hong V, Wei R, Nadjafi RF, Fischer H, Li Z, Shaw SF, Caparosa SL, Nau CL, et al.. Obesity and mortality among patients diagnosed with COVID-19: results from an integrated health care organization [published online August 12, 2020]. Ann Intern Med. doi: 10.7326/M20-3742.

6. alligeros M, Shehadeh F, Mylona EK, Benitez G, Beckwith CG, Chan PA, Mylonakis E. Association of obesity with disease severity among patients with coronavirus disease 2019.Obesity (Silver Spring). 2020; 28:1200–1204. doi: 10.1002/oby.228

7. O. Pinhas-Hamiel, R. S. Newfield, I. Koren, A. Agmon, P. Lilos, and M. Phillip, "Greater prevalence of iron deficiency in overweight and obese children and adolescents," International Journal of Obesity, vol. 27, no. 3, pp. 416–418, 2003.

8. L. B. Yanoff, C. M. Menzie, B. Den] kinger et al., "Inflammation and iron deficiency in the hypoferremia of obesity," International Journal of Obesity, vol. 31, no. 9, pp. 1412–1419, 2007

9. West BJ. Gas transport by the blood. In: John B West (ed.) Respiratory Physiology: The Essentials. 7th ed. Philadelphia, PA: Lippincott Williams & Wilkins; 2005:78–90. 7).

10. Misra A, Chowbey P, Makkar BM, Vikram NK, Wasir JS, Chadha D, et alConcensus Group.Consensus statement for diagnosis of obesity, abdominal obesity and the metabolic syndrome for Asian Indians and recommendations for physical activity, medical and surgical management J Assoc Physicians India. 2009; 57:163–7018).

11. Ravishanker P, Madanmohan, Udupa K, Prakash S. Correlation between body mass index and blood pressure indices, hand grip strength and handgrip endurance in underweight, normal weight and overweight adolescent. Indian J Physiol Pharmacol 2005;49(4):455- 61)

12. Knopp RH, Paramsothy P, Retzlaff BM, Fish B, Walden C, Dowdy A, Tsunehara C, Aikawa K, Cheung MC. Gender differences in lipoprotein metabolism and dietary response: basis in hormonal differences and implications for cardiovascular disease. Curr Atheroscler Rep. 2005;7:472–9

13. Jelkmann W. Regulation of erythropoietin production. J Physiol 2011; 598:1252–8.

14. Shahani S, Braga-Basaria M, Maggio M, Basaria S. Androgens and erythropoiesis:past and present. J Endocrinol Invest 2009;32:704.16

15. Masserli, FH etal. Borderline hypertension and obesity: two prehypertensive states with elevated cardiac output. Circulation 1982; 66:55-60

16. Monica Linea Vold, Ulf Aasebo, Hasse Melbye. Low FEV1, smoking history, and obesity are factors associated with oxygen saturation decrease in an adult population cohort. International Journal of COPD 2014:9 1225 .

17. Vishesh K Kapur, Anthony G Wilsdon, David Au, Mark Avdalovic et al. Obesity Is Associated with a Lower Resting Oxygen Saturation in the Ambulatory Elderly: Results from the Cardiovascular Health Study. Respir Care 2013;58(5):831–837–1233

18. Creteur J. Muscle StO2 in critically ill patients. Curr Opin Crit Care. 2008;13:361–366. doi: 10.1097/MCC.0b013e3282fad4e1.

19. Farhatul Inayah Adiputri, Armijn Firman, Arifin Soenggono correlation between oxygen saturation and haemoglobin and hematokrit level in tetralogy of fallot patients, AMJ.2016;3(1):152–5]

20. K. J. Ausk and G. N. Ioannou, "Is obesity associated with anemia of chronic disease?A population-based study," Obesity, vol. 16, no. 10, pp. 2356–2361, 2008.

Public Trust in Health System to Combat COVID-19 in Bangladesh

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Abstract

Bangladesh achieved remarkable growth in every aspect from economy to health, communication technology in short period of time. despite outstanding achievement, Recent covid 19 pandemic caused soreness over country health system as well in another sector. People are losing their trust and confidence over country policy. Trust and confidence between parties important to put health intervention in motion and overcome pandemic situation.

Keywords: Covid 19, Healthcare System.

Introduction

Bangladesh with the highest population density in the world (170 million people in 147,000 sq.km), is one of the most vulnerable nations to COVID-19. Bangladesh has been showing a promising economic growth rate of 7.5% in recent years, but no doubt the ongoing pandemic situation has affected the country in many spheres of socio-economic domain [1].While some richest countries with strong health systems have been struggling with the pandemic, a second wave is already hitting the shores of almost all of Europe. Bangladesh yet to flatten the epidemiological curve of the pandemic is struggling hard with its weak health system. As of 10th August, there are 260,507 confirmed cases of COVID-19 and 3834 related deaths reported by Institute of Epidemiology, Disease Control and Research (IEDCR)[2]. In addition, natural disasters related to monsoon like Amphan (cyclone), landslides and floodings are magnifying the burden of COVID-19.

Right now, Bangladesh is facing a multi-dimensional crisis where economic damages are more concerning than the health casualties [1]. The ready-made garments (RMG) sector is the prime export sector of Bangladesh employing more than 3.2 million workers. However, millions of garments workers have lost their jobs due to the current pandemic causing order cancellations[3]. Although coronavirus situation is under control in the Rohingya refugee camps [4], it is a high risk area considering the average population density of 40,000 people per sq.km in the camps along with widespread illiteracy and lack of hygiene practice[4]. Poverty, climate change and pre-existing public health conditions can exacerbate the impacts of Covid-19 and vice versa.

Bangladesh ranked 133rd among the 195 countries in 2016 Healthcare Access and Quality Index[5]. Islam and Biswas [6]mentioned, health expenditure of Bangladesh is 3% of the total Gross Domestic Product (GDP), and government bears around 34% of it and

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rest is out-of-pocket expenses. They further suggested, in spite of some success stories on Millennium Development Goals (MDGs), Bangladeshi health system possesses multiple challenges like lack of public health facilities, scarcity of skilled workforce, inadequate financial resource allocation etc. No doubt the current pandemic situation put huge burden to the existing health infrastructure and the situation can only be dealt with the public trust and community participation.

A global pandemic can be the greatest test of trust in a health system[7]. Relationship between the people and the existing health system can be very crucial to execute the public health interventions and draw cooperation from the community. An optimistic feeling assures better acceptance of the new interventions. Trust is expressed through actions and is the basis of constructing community-health system relationships[8]. A high level of trust in health system is a crucial determinant for acceptance of public health measures; on the other hand, mistrust can result an opposite effect.

We tried to understand the public trust and confidence on the health system to combat COVID-19 pandemic in Bangladesh in the light of the Trust-Confidence-Cooperation (TCC) model of Risk Management [8]. In their book, they suggested that trust and confidence are 2 principal pathways to cooperation. They defined trust as the willing in expectation of beneficial outcomes and confidence as the belief based on experience or evidence for a certain future event. Trust is built on the belief that community perceives that health system is taking care of the best interests of the community through transparency and health information. Confidence is built upon the past community experiences and health system performances during previous emergencies and core service delivery. Further both trust and confidence in a range of combination lead to cooperation. The TCC model is shown in figure1.

Figure 1. The Trust-Confidence-Cooperation model

Trust in the health system

Bangladesh has a robust health system infrastructure consisting of a network of primary, secondary and tertiary level hospitals. Around 460 Upazila Health Complexes (UHCs) and 13000 Community Clinics (CCs) has been established around the country serving the rural population at the lowest tier of the health system [9]. Studies have found a high level of generalized trust in services at UHCs with 98% of the respondents reporting that they were dependent on the UHCs for their treatment [10]. ANC and PNC services through primary healthcare centres (PHCs) helped to achieve some of the MDGs (MDG 4 & 5) by declining under-five mortality and maternal mortality which were exemplary to the

world[11]. The people are well aware of the existing health care centers around their communities and available services in those centers. The unique private-public partnership model of the community clinics is playing pivotal role in sustainable development of community health [9], and building trust and cooperation.

In early February of 2020, government evacuated around 300 Bangladeshi citizen from China[12]. Since the detection of the first COVID-19 case on 8th march, 2020, Government of Bangladesh has taken various steps to contain the pandemic [2]. A national COVID-19 response committee was formed, father of the nation Bangabandhu Sheikh Mujibur Rahman's birth centenary celebration was

cancelled, domestic and international flights were cancelled, government and private offices, institutes and factories were closed, armed forces were deployed to ensure social distancing and lockdown, and government also extended social programs to support the disadvantaged section of the society providing essential food items free or for a low cost[13, 14]. Many of the religious centers were transformed into temporary quarantine centers and an aggressive awareness campaign was launched through mobile phone operators and online platforms[12]. Around 500 telephone hotlines were launched and free online courses on COVID-19 were made available for the health professionals and general public (www. corona.gov.bd). Daily news briefs about the current corona situation were also made by the Ministry of Health on the national news channels to inform the people about the ongoing situations. Further, Prime Minister announced an economic stimulus package of $8.5 billion which is equivalent to 2.5% of the total GDP [12].

Confidence in health system

Government PHC services consists of UHCs, Union sub-centers and Community Clinics (CCs) reaches almost 105 million people living in the rural areas providing Essential Service Packages[11]. Khoorshid[9]reported the benefits of CCs as perceived by community people included free drugs (82.1%), free treatment (81.2%), easy access (76.3%), need-based health services (75.0%), and immunization services (68.6%). In another study, 91% of the respondents reported that the doctors at UHCs provide compassionate services to the patients[10]. However, core service deliveries were affected during the pandemic along with supply and prices of medicines and PPE in Bangladesh [15].

Bangladesh is endemic to many communicable diseases. Although we have good success stories of Extended Program on Immunization (EPI) and Filariasis Elimination Program, a developed public health and clinical management capacity in infectious diseases is still missing despite recurrent Nipah outbreaks. Currently, Institute of Epidemiology, Disease Control and Research (IEDCR)is conducting around 17 ongoing surveillance programs for some communicable and non-communicable diseases

(www.iedcr.gov.bd). However, repeated outbreaks of dengue with increasing cases each time also portray the real scenario. Bangladesh health system faces crisis of workforce with inequity in distribution and proportion of doctor-nurse-other staffs along with number of isolation beds to treat COVID-19[11, 16]. Severe shortage of PPE was reported in Bangladesh, where 25% of doctors and nurses, and 60% of other medical staffs were found engaged treating corona patients without PPE [17].

Bangladesh had only 192 dedicated ICU beds with ventilators in a population of around 170 million and one of the lowest testing rates per thousand population in the world[17]. In response to the emergency situation, total ICU beds were raised to 1169, however still the capacity is inadequate with inequitable distribution [16].Many news dailies reported great hassle to get tested for Covid-19 i.e., connecting with hotline, delay in getting results, getting wrong results, huge cue at test centers, wrong results and all samples not collected etc.[18, 19].

Erosion of trust and challenges

Bangladesh has a good rural community-based health care system but urban public primary health care is almost absent. As the COVID-19 entered into the country through the capital city of Dhaka to the smaller cities and to the rural areas, the health system struggled to the control the pandemic. When the pandemic started to spread rapidly within the country in a short time, people started to panic specially the city dwellers. A cross-sectional online survey in Bangladesh estimated that panic and generalized anxiety among the respondents were 79.6% and 37.3% respectively [20]. The lockdown and shutdown of economic activities put additional health challenges to the poor and vulnerable and compelled many people to come out of home in search of living. Moreover, a large number of corruption cases came into limelight when many political leaders and government officials were arrested for alleged corruption and theft of relief items [19]. In a popular national daily, corruption and the COVID-19 were reported as the twin viruses of Bangladesh[19]. Further remarks from the political leadership specially the health minister worsened the situation[18].

The pandemic has clearly shown that there is severe lack of coordination between various

government agencies, and unprepared uncoordinated mitigation measures pushing the country into health and economic crisis [14]. Unlike developed countries Bangladesh doesn't have a centralized health system and private sector largely provide services to the upper section of the society. This inequity put more mistrust into the pandemic situation. A clear negative public perception on government actions taken against COVID-19 has been reported along with failure of the Ministry of Health to communicate with the mass people [13]. However, people connected and trusted more on the message from the Honourable Prime Minister.

Conclusion

The ongoing COVID-19 pandemic has caused widespread panic and stress among people of all strata of the society. These unknown periods of uncertainties could be assured by a resilient trustworthy health system. Bangladesh is situated in a crossroad of development where various dynamics are working together resulting both positive and negative outcomes. When Bangladesh has set some exemplary achievements in the field of global health, the ongoing COVID-19 pandemic has shown us that many problems are there at the foundation of our health system. At the initial phase of COVID-19 pandemic, people of Bangladesh were hopeful with government promises, economic stimulus announcements and past experiences health system. However subsequent spread of COVID-19 cases, corruption allegations and hassles faced during help seeking made people lost their trust to the health system.

Ethical clearance: This study comprised with secondary data and does not use any information regarding person thus no ethical approval needed.

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Conflict of interest: The authors declare no conflict of interest.

References

1. Rashid SF, Theobald S, Ozano K. Towards a socially just model: balancing hunger and response to the COVID-19 pandemic in Bangladesh. BMJ Glob Health. 2020;5(6):e002715.

2. WHO. Coronavirus disease (COVID-2019) Bangladesh situation reports.

3. Anner M. The Impact of Covid-19 on Workers and Businesses at the Bottom of Global Garment Supply Chains. 2020.

4. Islam MM, Yunus MDY. Rohingya refugees at high risk of COVID-19 in Bangladesh. The Lancet Global Health. 2020;8(8):e993-e4.

5. Barber RM, Fullman N, Sorensen RJD, Bollyky T, McKee M, Nolte E, et al. Healthcare Access and Quality Index based on mortality from causes amenable to personal health care in 195 countries and territories, 1990–2015: a novel analysis from the Global Burden of Disease Study 2015. The Lancet. 2017;390(10091):231-66.

6. Islam A. Health System in Bangladesh: Challenges and Opportunities. American Journal of Health Research. 2014;2(6):366.

7. Gopichandran V, Subramaniam S, Kalsingh MJ. COVID-19 Pandemic: a Litmus Test of Trust in the Health System. Asian Bioeth Rev. 2020;12(2):213-21.

8. Earle T, Siegrist M, Gutscher H. Trust, Risk Perception and the TCC Model of Cooperation1. Trust in Cooperative Risk Management: Uncertainty and Scepticism in the Public Mind. 2012.

9. Riaz BK, Ali L, Ahmad SA, Islam MZ, Ahmed KR, Hossain S. Community clinics in Bangladesh: A unique example of public-private partnership. Heliyon. 2020;6(5):e03950.

10. Haque MM, editor Citizens trust in public institution: A studyof service delivery institutions at local level in Bangladesh2016.

11. World Health O, Alliance for Health P, Systems R. Primary health care systems (primasys): case study from Bangladesh: abridged version. Geneva: World Health Organization; 2017 2017. Contract No.: WHO/HIS/HSR/17.12.

12. Sheikh Tanjeb I, Yash Nitin D. COVID-19: How Bangladesh should respond to economic threats 2020 [Available from: https://www.weforum.org/agenda/2020/04/covid-19-coronavirus-bangladesh.html.

13. Islam MD, Siddika A. COVID-19 and Bangladesh: A study of the public perception on the measures taken by the government. 2020.

14. Anwar S, Nasrullah M, Hosen MJ. COVID-19 and Bangladesh: Challenges and How to Address Them. Front Public Health. 2020;8:154.

15. Godman B, Kurdi A, Sefah I, Murshid ME, Hossain MM, Islam Z, et al. Availability and price changes of potential medicines and equipment for the prevention and treatment of COVID-19 among pharmacy and drug stores in Bangladesh; findings and implications. Bangladesh Journal of Medical Science. 2020;19(0):S 36-S 50.

16. Khan MHR, Howlader T, Islam MM. Battling the COVID-19 Pandemic: Is Bangladesh Prepared? : medRxiv; 2020.

17. Anik SSB, Hasan K. Bangladesh fighting Covid-19 with only 192 ICU beds, ventilation facilities 2020 [Available from: https://archive.dhakatribune.com/health/coronavirus/2020/04/20/bangladesh-fighting-covid-19-with-only-192-icu-beds-ventilation-facilities.html.

18. Joarder T, Bin Khaled MN, Zaman S. Health systems trust in the time of Covid-19 pandemic in Bangladesh: A qualitative exploration. medRxiv. 2020:2020.08.05.20157768.

19. Choudhury Z. OP-ED: The twin viruses of Bangladesh: Corona and corruption 2020 [Available from: https://archive.dhakatribune.com/opinion/op-ed/2020/07/16/op-ed-the-twin-viruses-of-bangladesh-corona-and-corruption.html.

20. Islam MS, Ferdous MZ, Potenza MN. Panic and generalized anxiety during the COVID-19 pandemic among Bangladeshi people: An online pilot survey early in the outbreak. J Affect Disord. 2020;276:30-7.

Estimation of Serum Alkaline Phosphatase, Total Calcium and Urinary Hydroxyproline as Bone turn over marker in Post-Menopausal women in Tertiary care Hospital

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Abstract

Background: Osteoporosis is one of the prevalent diseases of post-Menopausal women. Hence to evaluate the severity of osteoporosis serum calcium, serum ALP and urinary hydroxyproline used as bone resorption marker.

Method: 30 post-menopausal women with osteoporosis were compared with healthy pre-menopausal 25-40 years of women. Random Blood sample collected from venipuncture and centrifuged to get serum. Fasting Urine sample was collected and 1.2 drops 6 N HCl was added as preservative. The parameter compared between pre- and post menopausal were, serum calcium, alkaline phosphatase, total protein, Albumin, Urine test included Hydroxyproline,creatinine and results were noted.

Results: Comparison of S. calcium, S.alkalinePhosphatase, S. Protein,S. Albumin and Urinary hydroxyproline. Urinary creatinine were compared and every parameters had highly significant p value (p<0.001).

Conclusion: These results demonstrate that biochemical markers of bone turn over like serum total ALP total calcium provide dynamic measure of bone remodelling and helps to predict the changes in bone mass and fracture of risk in post-menopausal women.

Keywords: Menopause, osteoporosis, fracture, remodelling

Introduction

Bone is a highly Vascular connective tissue hence it has remodelling process throughout life[1]. Osteoblast and osteoclast will balance the bone contents up to 30-35 years. From 5th decade of life resorption slightly exceeds resulting into negative balance as evidenced by osteoporosis during menopause[2]. Osteoporosis is a disease that causes a reduction in the mass of bone per unit volume. There is a close relationship between estrogens deprivation and its development. PTH and calcitriol are principal hormones regulating these processes.

It is estimated that over 200 million people worldwide suffer from osteoporosis[3]. Approximately there were 30% post-menopausal women and 15 to 20% men[4]. It has major risk factor

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of bone fractures which high rate of morbidity and mortality hence attempt was made to evaluate blood and urine sample study to treat the osteoporosis to avoid morbidity and mortality in elder population.

Material and Method

30 (thirty) post-menopausal women regularly visiting to Mahatma Gandhi Memorial Hospital, Warangal, Telangana – 506002 were studied.

Inclusive Criteria: Clinically and radio-logically diagnosed post-menopausal women were selected for study.

Exclusion Criteria: Post-menopausal women who are already in treatment and having other endocrine disorders like Thyroid, diabetic, cardio-neurological complications were excluded from study.

Method

Apart from 30 post-menopausal, 30 healthy pre-menopausal female aged between 20-40 years with no history of smoking and alcohol intake were also studied and compared with post-menopausal osteoporotic women.

Post history and clinical details of every patient was noted Random blood samples were collected by venipuncture after taking aseptic precautions in two tubes which were properly labelled. The blood in the plain bottle was allowed to stand for about 30-40 minutes for the clot formation and separation of serum then it was centrifuged and serum was collected in another plain tube. The serum is used for the estimation of serum calcium, alkaline phosphate, total proteins and albumin immediately.

Urine container – Fasting urine sample was collected in a clean sterile was collected in a clear sterile bottle 1-2 drops of 6N HCL is added as preservative as precipitate during and after collection. Parameters estimated included calcium (o-cresolpthalein complex one, end point method) alkaline phosphatase (para-Nitrophenyl phosphate, kinetic assay), total protein, (modified Biuret, End point assay). Albumin (bromocresol green, End point method). Urine test included 1-Hydroxyproline (Modified Neuman and Logan method), Creatinine (Alkaline picrate method).

Duration of study was June-2012 to 2015

Statistical and analysis: Various parameters of blood and urine results were compared in both pre and post-menopausal and significant results were noted. The statistical analysis was carried out SPSS software.

Observation and Results

Table-1: Comparison of serum calcium in pre and post menopausal 8.2 (mg/dl) minimum, 10.7 (mg/dl) maximum in pre-menopausal, mean value 9.5 ± 0.6, 6.9 (mg/dl) minimum value, 10.2 and (mg/dl) maximum value in post-menopausal and mean value 8.4 ± 0.8 and p value is highly significant (p<0.001)

Table-2: Comparison of serum alkaline phosphatase level in pre and post menopausal 57 (IU/L) minimum, 79 (IU/L) maximum in pre-menopausal, mean value 70.6 ± 4.9, 118 (IU/L) minimum value, 132 (IU/L) maximum value in post-menopausal and mean value was 124.6 ± 4.6 and p value is highly significant (p<0.001)

Table-3: Comparison of Total protein levels in pre and post menopausal 5.8 (gm/dl) minimum, 8.1 (gm/dl) was maximum in pre-menopausal, mean value was 67 ± 0.7, 3.3 (gm/dl) was minimum value, 7.4 (gm/dl) was maximum value in post-menopausal and mean value was 6.1 ± 0.9 and p value is highly significant.

Table-4: Comparison of Albumin level in pre and post menopausal 2.8 (g/dl) was minimum, 4.4 (gm/dl) was maximum level in pre-menopausal, mean value was 3.5 ± 0.4, and p<0.001. 2.0 (g/dl) was minimum value, 4 (g/dl) was maximum value in post-menopausal mean value was 3.1 ± 0.4 and p<0.001 (p value is highly significant)

Table-5 (a): Comparison of Urinary Hydroxyproline levels in pre and post menopausal 11 (mg/24 hours) was minimum, 21.9 (mg/24 hours) was maximum level in pre-menopausal, mean value was 17.8 ± 3.2, 27.4 (mg/24 hours) was minimum value, 48.9 (mg/24 hours) was maximum value in post-menopausal mean value was 35.3 ± 4.8 and p<0.001 (p value is highly significant)

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Table-5 (b): Comparison study of Urinary Creatinine levels in pre and post menopausal 0.6 (g/24 hrs) was minimum, 1.5 (g/24 hrs) was maximum level in pre-menopausal, mean value was 1.0 ± 0.2, 0.6 (g/24 hrs) was minimum value, 1.5 (g/24 hrs) was maximum value in post-menopausal mean value was 0.8 ± 0.2 and p<0.001 (p value is highly significant)

Table 1: Comparison of serum calcium in pre and post menopausal women

Parameter	Group	Minimum	Maximum	Mean ± SD	p value
Serum calcium (mg/dl)	Pre-menopausal	8.2	10.7	9.5 ± 0.6	P<0.001
	Post-menopausal	6.9	10.2	8.4 ± 0.8	P<0.001

P value is highly significant (p<0.001)

Table 2: Comparison of serum alkaline phosphatase level in pre and post menopause

Parameter	Groups	Minimum	Maximum	Mean ± SD	p value
Alkaline phosphatase (IUIL)	Pre menopause	57	79	70.6 ± 4.9	P<0.001 highly significant
	Post menopause	118	132	124.6 ± 4.6	

P value is highly significant (p<0.001)

Table 3: Comparison of Total protein levels in pre and post Menopause

Parameter	Groups	Minimum	Maximum	Mean ± SD	p value
Total protein (gm/dl)	Pre menopause	5.8	8.1	67 ± 0.7	P<0.001 highly significant
	Post menopause	3.3	7.4	6.1 ± 0.9	

P value is highly significant (p<0.001)

Table 4: Comparison of Albumin level in pre and post Menopause

Parameter	Groups	Minimum	Maximum	Mean ± SD	p value
Albumin (g/dl)	Pre menopause	2.8	4.4	3.5 ± 0.4	P<0.001 highly significant
	Post menopause	2.0	4	3.1 ± 0.4	

P value is highly significant (p<0.001)

Table 5 (a): Comparison of Urine Hydroxyproline level in pre and post Menopause

Parameter	Groups	Minimum	Maximum	Mean ± SD	p value
Urinary Hydroxyproline level	Pre menopause	11	21.9	17.8 ± 3.2	P<0.001 highly significant
	Post menopause	27.4	48.9	35.3 ± 4.8	

P value is highly significant (p<0.001)

Table 5 (b): Comparison of Urine Creatinine level in pre and post Menopause

Parameter	Groups	Minimum	Maximum	Mean ± SD	p value
Urinary Creatinine level	Pre menopause	0.6	1.5	1.0 ± 0.2	P<0.001 highly significant
	Post menopause	0.6	1.5	0.8 ± 0.2	

P value is highly significant (p<0.001)

Discussion

Present comparison study of serum alkaline phosphatase, total calcium and urinary hydroxyproline as bone turn over marker in post menopausal versus pre-menopausal women in tertiary care hospital. Serum calcium in pre-menopausal minimum value was 8.2 (mg/dl) and maximum value was 10.7(mg/dl) mean value 9.5 ± 0.6. In post-menopausal minimum value 6.9 (mg/dl) and maximum 10.2(mg/dl) mean value 8.4 ± 0.8 and p<0.001 p value was highly significant (Table-1). Comparison of serum alkaline phosphatase levels in pre and post menopausal. In pre-menopausal minimum value 57 (IU/L), maximum value 79 (IU/L) and mean value 70.6 ± 4.9. In post-menopausal minimum value 118(IU/L) and maximum value 132(IU/L) mean value 124.6 ± 4.6 and p<0.001 (p value is highly significant) (Table-2). Comparison of Total protein levels in pre and post menopausal. In pre-menopausal minimum value was 5.8(gm/dl) and maximum 8.1 (gm/dl) mean value 67 ± 0.7. In post-menopausal minimum value was 3.3 (gm/dl) maximum 7.4 (gm/dl) mean value was 6.1 ± 0.9 and p value was highly significant (p<0.001) (Table-3). Comparison of albumin levels in pre and post menopausal women. In pre-menopausal minimum value was 2.8 (g/dl), maximum 4.4(g/dl) mean value 3.5 ± 0.4. In post-menopausal minimum value 2.0(g/dl), maximum 4(g/dl), mean value 3.1 ± 0.4 and p<0.001 (p value was highly significant) (Table-4). Comparison of Urinary hydroxyproline level in pre and post menopausal. In pre-menopausal minimum 11 (mg/24 hrs) maximum 21.9 (mg/24 hrs) mean value 17.8 ± 3.2 In post-menopausal minimum value 27.4 (mg/24 hrs) maximum 48.9(mg/24 hrs) and mean value 35.3 ± 4.8 and (p<0.001) p value was highly significant(Table-5 A). Comparison of creatinine level in pre and post-menopausal. In pre-menopausal minimum value 0.6 maximum 1.5 mean value 1.0 ± 0.2. In post menopausal minimum value 0.6, maximum 1.5 mean value 0.8 ± 0.2 and p<0.001 (p value was highly significant) (Table-5 B). These values were more or less in agreement with previous studies [5][6][7].

It is reported that High bone turnover rate seems to play an increasing role as determinant of bone mass with increasing post-menopausal age [8]. Alkaline phosphatase are family of zinc metaloenzymes, they release inorganic phosphate from various organic orthophosphate, ALP is a enzyme that transports metabolites across cell membrane [9]. It is a ubiquitous enzyme that plays an important role in osteoid formation and mineralization.

Common metabolic bone disorders such as osteoporosis results from a rearrangement in birth or death of osteoblast express relative high amount of alkaline phosphatase [10].

The fact the evidence observed in mice is loss of sex-steroid up-regulate the formation of osteoclast and osteoblast in marrow by up-regulating the production and action of cytokines that are responsible for osteoblastogenesis and osteoclastogenesis [11]. Estrogens deficiency at menopausal phase increases the rate of remodelling, which results in high turnover bone loss, because osteoblast do not function due to lack of hormone. Hence hormones directly controls the osteogenesis when dwindling of hormones and begins at the age above 45-50 years the osteoporosis is also begins and fracture of bone leads to high rate of morbidity and mortality.

Summary and Conclusion

In the comparative study of estimation of ALP (serum alkaline phosphatase), total serum calcium and urinary hydroxyproline as bone turn over marker has significant results. Total serum calcium has significantly decreased and S. ALP , urinary hydroxyproline had more values because excretion hydroxyproline was higher in post-menopausal which is related to increase in age.

The Biochemical markers reflect whole body rates of bone resorption and bone formation. They provide a representative index of overall skeletal loss, but this study demands further study in more number of post-menopausal women to confirm these significant results because exact factors and mechanism of osteoporosis is still unclear.

Limitation of study – Owing to tertiary location of studied hospital, small number of patients and lack of latest technologies we have limited results.

- This research paper was approved by Ethical committee of Kakatiya Medical College, Warangal, Telangana-506002.
- No conflict of Interest
- No Funding

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Urinary Hydroxyproline as Bone turn over marker in Post-Menopausal women in Tertiary care Hospital

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References

1. Seeman E, Delmas PD – Bone quality the material and structural basis of bone strength and fragility N. Eng. J. Med. 2006, 354, 2250-61.

2. Licata A – Bone density vs bone quality what clinician to do? Cleve Clin. J. Med. 2009, 76; 331-6.

3. Cooper C, Campion G – 3rd hip fracture in elderly; a worldwide projection osteoporosis Int. 1992, 2 (6); 285-9.

4. Rendell A, Sam brook PN – Direct clinical and welfare costs of osteoporotic fractures in elderly men and women osteoporosis Int. 1995, 5; 427-32.

5. Reginster JY, Burled N – Osteoporosis A still increasing prevalence Bone 2006, 38; 54-59.

6. Kanis JA, John ell O – A meta-analysis of previous fracture and subsequent fracture risk. Bone 2004, 35 (2); 375-2.

7. Melton III LJ, Atkison EJ – Vertebral fractures predict subsequent fractures osteoporosis Int. 1999, 10; 214-21.

8. Ivaska KK, Lenora J – Serial assessment of serum Bone metabolism marker J. Clin. endocrinol metabolism 2007, 93; 2622-2632.

9. Adok M, Shivapuri JN – Enzymatic and Non-enzymatic liver function test Res. J. Phar. Biol. Chem. Sc. 2010, 1 (4); 593-597.

10. Ashuma sachidera – Study of common menopausal women 2005, 20 (1); 131-134.

11. Gerdham P, Ivaska KK – Biochemical marker of bone metabolism and prediction of fracture in elderly women 2004, 19 (3); 386-88.

Awareness and Attitude towards Human Papilloma Virus Vaccine among Medical Students of a Premier Medical College, Mysuru

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Abstract

Background: Cervical cancer is a relatively neglected disease in terms of advocacy, screening and prevention from professional or public health organizations. As preventing cancer with the help of a vaccine is a revolutionary concept, awareness and education about it will have important implication in the implementation of this strategy.

Aim & Objective: To assess the knowledge about HPV to create awareness among the population and to assess awareness and attitude towards Human Papilloma Virus (HPV)Vaccine among Medical Students.

Methodology: A cross sectional study conducted among medical students, after obtaining written consent for participation, a pre tested semi structured questionnaire was distributed to all students of both sexes studying MBBS in 2nd and 3rd year who are exposed to clinical postings and 1st year MBBS students who are studying non clinical subjects were included in the study.Descriptive statistical measures like percentages were used for qualitative data and quantitative data were expressed as mean and standard deviation. Appropriate statistical tests applied using SPSS Version 22 software and expressed statistically at p-value less than 0.05**.**

Results: 210(57.7%) were below 20 years and 233(64%) were females and about 173(47.5%) were from 1st term MBBS and 191(52.5%) were from 7th term MBBS students.There is an increased acceptance of HPV vaccine among female and male students which was found to be statistically significant <0.001.

Conclusion: The overall knowledge about HPV is very low among the medical students and also vaccine uptake is very low and amenable barriers exist against vaccine.

Key words: Cervical cancer, HPV, Medical students, Awareness

Introduction

Cancer cervix (CC) is the second most common malignancy among women worldwide. In developing countries, it is also the most common cause of cancer deaths among women. Human papilloma virus (HPV) is one of the most common causes of sexually

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transmitted infections in the world. HPV responsible for approximately 90% of cases of invasive cervical cancer [1-3] and is a major cause of mortality in women and 80% of women who are sexually active get affected by persistent Human Papilloma Virus (HPV) infection leading to cervical malignancy.[4] Cervical cancer occurs relatively early during the lifespan of woman. The infection is very commonly found in young women who are sexual activity at an early stage or before 25 years of age without any clinical consequence.[5] The incidence starts rising from 30–34 years of age and peak occurs in the decade between 55–65 years.[6] It is easily preventable through routine screening, follow up, and treatment. In India, cervical cancer remains as the commonest female cancer with an annual incidence of more than 1,32,000 every year.[7] The HPV types 16 and 18 contribute to around 74% of cervical cancers[8] as well as to cancers of the anus, penis, vulva, vagina, mouth and oropharynx.[9] The HPV types 6 and 11 cause almost all cases of genital warts.[10] Coinfection of CC with human immune deficiency virus (HIV), herpes simplex virus type II, infection by Chlamydia trachomatis, poor personal hygiene, early marriage, tobacco usage, multiple sexual partners, and long term usage of oral contraceptives causes additional risk for cervical cancer.[11]

Though the incidences of CC are more, it is found to be less known in the population. A stimulated search for preventive vaccines occurred after the recognition of the dreaded virus causing cervical cancer. HPV vaccines have been introduced in many developed countries in recent years. As preventing cancer with the help of a vaccine is a comparatively new concept, awareness and education will have important implication in the implementation of this strategy. Two types of recombinant vaccines against HPV have been approved for use in India and several countries like USA, Australia and in the European Union marketed as Gardasil and Cervarix.[12]

The World Health Organization, Food and Drug Administration, Centre for Disease Control and Global Advisory Committee on Vaccine Safety have confirmed and declared that the vaccine is safe and effective.[13-15] The FUTURE trials conducted have demonstrated an efficacy of 91-100%.[16] However, for the public to be aware, it is essential that those

in the medical field have a sound knowledge about it. This includes health care professionals as well as medical students. It has to be understood that, the mere availability of an effective vaccine is not synonymous with an effective vaccination program. Therefore, medical students, as healthcare providers in the future, would be influential in affecting the community's views and thereby the uptake of the Human Papillomavirus vaccine.

Hence, there is a need to promote the right attitude for prompt implementation of this vaccine among medical students. With this background, we conducted a study among the medical students to assess their knowledge about HPV infection and to know their level of awareness and attitude towards HPV vaccine which lead to creating awareness among the population.

Materials and Methods

A cross sectional study conducted among medical students using purposive sampling technique. The criteria for selection was all the students who were present during the study period were included after taking consent and the only criterion for exclusion was those who were absent at the time of survey and after three subsequent visits to the class. A written consent for participation which was collected separately after it had been signed by the participant to avoid personal identification. Thus, anonymity and confidentiality of the participants was guaranteed.

A pre tested semi structured questionnaire was distributed to a total of 364 students of both sexes studying MBBS in 2nd and 3rd year who are exposed to clinical postings and 1st year MBBS students who are studying non-clinical subjects were included in the study.

Students in three batches of 100 each were taken for collecting data and were encouraged to participate in the study. The personal right to withdraw from the survey at any moment was ensured.

Descriptive statistical measures like percentages were used for qualitative data and quantitative data were expressed as mean and standard deviation. Appropriate statistical tests and Inferential Statistics were applied as needed using SPSS Version 22

software. The differences, association, correlation, and regression were expressed statistically at p-value less than 0.05.

Results

Among the study participants, 210 (57.7%) were below 20 years and 233 (64%) were females and about 173 (47.5%) were from 1st term MBBS and 191 (52.5%) were from 7th term MBBS students. **Awareness and attitude:** It was seen that 340 (93.4%) of the students were aware regarding the preventable nature of CC, 319 (87.6%) knew the aetiology of CC and 261 (71.5%) and 265 (72.8%) were aware about the availability and target population for vaccination respectively. It was noted that only 135 (37.1%) were aware of the vaccine dosage and 129 (35.4%) students about need to vaccinate men. (Table 1). There is an increased acceptance of HPV vaccine among female and male students which was found to be statistically significant <0.001. There was not much difference in acceptance of HPV vaccine among the students based on their level of clinical exposure. (Table 2). Statistical analysis was done separately for 7th term and 1st term study participants. Among the 7th term students it was seen that females were better aware of HPV than males which was found to be statistically significant with p value <0.001, in comparison to 1st term students where there was a poor knowledge of HPV among females than males which was statistically significant with p value of 0.022. (Table 3). It was also noted that students who were exposed to clinical postings had a good knowledge of HPV and vaccines than those not exposed which was found to be statistically significant with p value <0.001. (Table 4)

Table 1: Awareness regarding HPV among the study participants

Clubs	Awareness among participants
Awareness regarding	**Number (%)**
preventable nature of cervical cancer	340 (93.4)
Etiology of cervical cancer	319 (87.6)
availability of vaccine	261 (71.5)
target population for vaccination	265 (72.8)
need to vaccinate men	129 (35.4)
catch up program	183 (50.3)
vaccine dosage	135 (37.1)
protective efficacy	242 (66.5)

Table 2: Association of demographic characteristics in acceptance of HPV vaccine among the study participants

	Yes (%)	No (%)	Do not know (%)	P value
Gender				<0.001
Male	69(53.1)	38(29.2)	23(17.7)	
Female	190(81.9)	6(2.6)	36(15.5)	
Education				0.338
Non clinical	118(68.2)	22(12.7)	33(19.1)	
clinical	141(74.6)	22(11.6)	26(13.8)	

Table 3: Association of awareness level among 7th term and 1st term students

	Awareness Among 7th Term Participants		Total	Chi square	P value
Gender	**Poor**	**Good**			
Male	57 (77.0%)	17 (23.0%)	74		
Female	47 (40.2%)	70 (59.8%)	117	24.827	<0.001
Total	104(54.5%)	87 (45.5%)	191		

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	Awareness Among 1st Term Participants				
Male	53 (93.0%)	4 (7.0%)	57	5.267	0.022
Female	92 (79.3%)	24 (20.7%)	116		
Total	145 (83.8%)	28 (16.2%)	173		

Table 4: Association of awareness level based on Non clinical and Clinical exposure among the study participants

Awareness	Non Clinical	Clinical	Total	Chi square	P value
Poor	145 (58.0%)	105 (42.0%)	250	35.105	
Good	28 (24.6%)	86 (75.4%)	114		<0.001
Total	173 (47.5%)	191 (52.5%)	364		
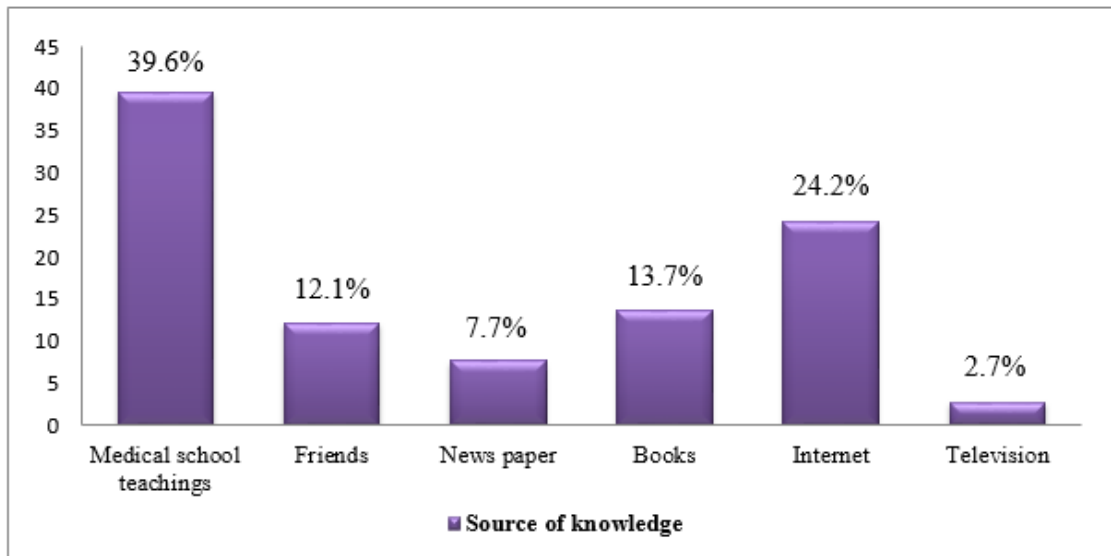
Fig 1: Showing various sources of knowledge of HPV
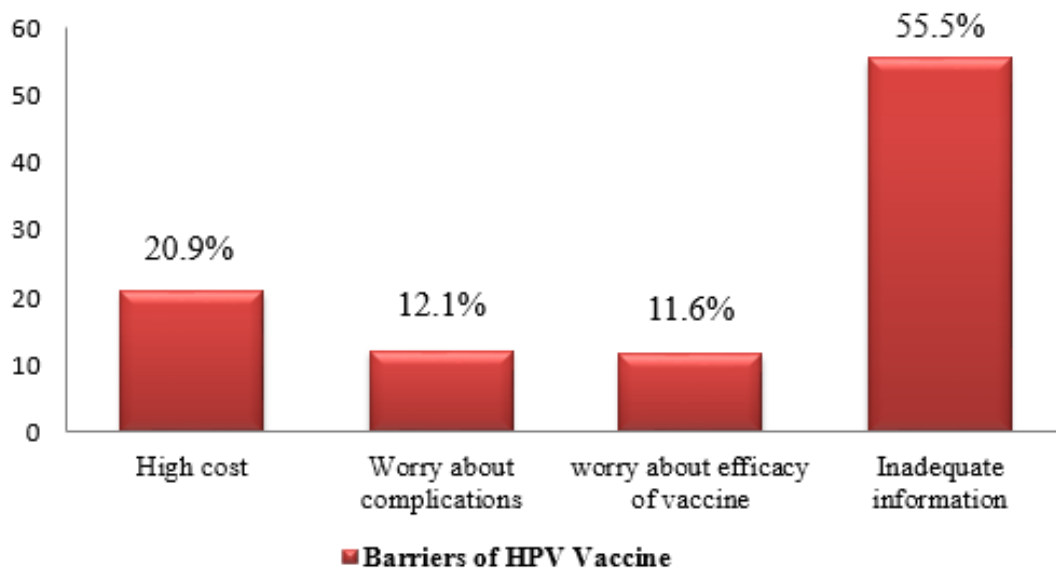
Fig 2: Showing various barriers of HPV vaccine

Discussion

Cancer is an invincible disease which has plagued mankind for centuries. The development of HPV vaccine represents a huge advancement in the fight against cervical cancer. In this study, we found that medical students did not know the incidence of cervical cancer in India. We observed that the level of awareness about HPV and HPV vaccine was extremely low among 1st year students in comparison to 7th term students. The lack of knowledge may be due to their non-exposure to the clinical postings at the beginning of 1st year MBBS and also the fact that the HPV infection is mainly asymptomatic and in 90% of cases the infection clears off without treatment. In the present study 93.4% of the students were aware regarding the preventable nature of CC and only 37.1% were aware of the vaccine dosage whereas only 35.4% students knew about need to vaccinate, which was consistent with the study conducted by Saha et al[17] in Kolkata who revealed a very low level of awareness among the graduate and postgraduate students. Another study conducted to find out awareness about the risk factors for cervical cancer among the educated youth in India, Sri Lanka and Nepal and the average awareness was found to be 66% in India, 58.8% in Nepal and 57.7% in Srilanka respectively.[18] In this study we found that among the 7th term students it was seen that females were better aware of HPV than males which was found to be statistically significant with p value <0.001, in comparison to 1st term students where there was a poor knowledge of HPV among females than males which was statistically significant with p value of 0.022. Most participants believe that their parents could pay for the vaccine and almost 66.5 % would get the vaccine if it were free, which is in agreement with the study conducted by S Mehta et al, who reported that 66.8% were willing to accept the HPV vaccine.[19] Our study found that only 2(0.54%) participants were found to be vaccinated prior to this study. The major obstacles to implementation of HPV vaccine programs in our country as mentioned by Bhatla N et al[20] included cost, acceptability, lack of public awareness, infrastructure and concern about unknown side-effect. In a review article by Bharadwaj at al[21] high cost of the vaccines was stated as the major concern for mass vaccination program in India.

Conclusion & Recommendation

Vaccine uptake is very low among medical students and amenable barriers exist against the vaccine. HPV vaccine for primary prevention of cervical cancer is a revolutionary concept and medical students, our future clinicians will be able to play a pivotal role in popularizing this strategy.

Educational initiatives targeting health care professionals have a definitive role in fostering vaccine acceptance. Therefore, urgent intervention in the form of information session is recommended targeted at the medical students, to eliminate the barriers of Human Papilloma Virus vaccination.

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Ethical clearance: Taken from Institutional Ethics Committee.

References

1. Wong LP, Wong YL, Low WY, Khoo EM, Shuib R. Knowledge and awareness of cervical cancer and screening among malaysian women who have never had a pap smear: A qualitative study. Singapore Med J. 2009; 50:49-53.

2. Monsonego J, Zerat L, Syrj-nen K, Zerat JC, Smith JS, Halfon P. Prevalence of type-specific human papillomavirus infection among women in france: Implications For screening, vaccination, and a future generation of multivalent HPV vaccines. Vaccine. 2012; 30:5215-21.

3. Gebrie M, Belete M, Lemlem S, Woreta H. Knowledge, preventive practice and associated factors of female nurses' towards cervical cancer in the selected government hospitals in Addis Ababa, Ethiopia. J Diabetes Metab 2015;6:28.

4. Sichanh C, Quet F, Chanthavilay P, Diendere J, Latthaphasavang V, Longuet C, et al. Knowledge, awareness and attitudes about cervical cancer among women attending or not an HIV treatment center in Lao PDR. BMC Cancer 2014;14:161.

5. Kaartigeyan K. Cervial cancer in India and HPV vaccination. Ind. J Medical Pediatric Onco. 2012:33:7-12

6. Giles M, Garland S. A study of women's knowledge regarding human papillomavirus infection, cervical

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cancer and human papillomavirus vaccines. Aust NZJ Obstet Gynaecol. 2006; 46:311-5

7. Munoz N, Bosch FX, Castellsague X, Diaz M, de Sanjose S, Hammouda D, et al. Against which human papillomavirus types shall we vaccinate and screen? The international perspective. Int. J Cancer. 2004; 20(2):278- 85.

8. Parkin DM, Bray F. Chapter 2: The burden of HPVrelated cancers. Vaccine. 2006; 24(3):S11-25.

9. Lacey CJ, Lowndes CM, Shah KV. Chapter 4: Burden and management of noncancerous HPV-related conditions: HPV-6/11 disease. Vaccine. 2006; 24(3):S3-35-S3/41.

10. Husain RS, Ramakrishnan V. Global variation of human papillomavirus genotypes and selected genes involved in cervical malignancies. Ann Glob Health 2015;81:67583.

11. Indian Academy of Pediatrics Committee on Immunization IAPCOI. Consensus recommendations on immunization, 2008. Indian Pediatrics. 2008; 45(8):635.

12. Kash N, Lee MA, Kollipara R, Downing C, Guidry J, Tyring SK. Safety and Efficacy Data on Vaccines and Immunization to Human Papillomavirus. Journal of Clinical Medicine. 2015; 4(4):614-633.

13. Nakalembe M, Mirembe FM, Banura C. Vaccines against human papillomavirus in low and middle income countries: a review of safety, immunogenicity and efficacy. Infectious agents and cancer . 2015; 10(1):17.

14. Basu P, Banerjee D, Singh P, Bhattacharya C , Biswas J. Efficacy and safety of human papillomavirus vaccine for primary prevention of cervical cancer: A review of evidence from phase III trials and national programs. South Asian journal of cancer . 2013; 2(4):187.

15. Future II Study Group. Prophylactic efficacy of a quadrivalent human papillomavirus (HPV) vaccine in women with virological evidence of HPV infection. Journal of Infectious Diseases . 2007; 196(10):1438 -1446.

16. Saha A, Nag Chaudhury A, Bhowmik P, Chatterjee R. Awareness of Cervical Cancer Among Female Students of Premier Colleges in Kolkata, India. Asian Pacific Journal of Cancer Prevention. 2010; 11:1085-90.

17. Teresa J, Brijesh S, Chacchu B, Jenny C. Awareness of Cervix Cancer Risk Factors in Educated Youth: A CrossSectional, Questionnaire Based Survey in India, Nepal, and Sri Lanka. Asian Pacific J Cancer Prev. 2011; 12:1707-12.

18. Mehta S, Rajaram S, Goel G, Goel N. Awareness about Human Papilloma Virus and its vaccine among medical students. Indian journal of community medicine: official publication of Indian Association of Preventive & Social Medicine. 2013; 38(2):92.

19. Neerja B, Elizabeth J. Cervical cancer prevention & the role of human papillomavirus vaccines in India. Indian J Med Res. 2009; 130:334-340.

20. Mausumi B, Showket H, Vilas N, Bhudev CD. HPV & HPV vaccination: Issues in developing countries. Indian J Med Res. 2009; 130:327-33

21. Bharadwaj, Mausumi & Hussain, Showket & Nasare, Vilas & Das, Bhudev. (2009). HPV & HPV vaccination: Issues in developing countries. The Indian journal of medical research. 130. 327-33.

Placental Laterality as a Predictor for Development of Preeclampsia

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Abstract

Background: Preeclampsia is a pregnancy-related condition characterized by high blood pressure and proteinuria after 20 weeks of pregnancy. It's a multiorgan disorder with no recognized cause. It's one of the most prevalent pregnancy problems, and it's a leading cause of maternal and foetal mortality and morbidity

Objectives: To determine the placental laterality as a predictor for development of pre-eclampsia.

Methods: 100 pregnant women with gestational age between 18 to 24 weeks with h/o pre-eclampsia were included. ultrasonography was used to determine the position of the placenta in all 100 women. When the placenta was evenly divided across the right and left sides of the uterus, regardless of anterior, posterior, or fundal location, it was categorized as central.

Results: The mean age group was 23.53 ± 3.15 yrs. The prevalence of pre-eclampsia in this study was 14%. This screening test has Sensitivity of 81%, Specificity of 85.3%, Positive predictive value of 47.2%, Negative predictive value of 96.43%, p value <0.001 which is significant.

Conclusion: Placental laterality is an excellent screening tool for the prediction of pre-eclampsia aids in the identification of the individuals particularly at risk, allowing them to be included in a primary prevention programmes.

Keywords: Placenta, Pre-eclampsia, Unilateral placenta, Central placenta

Introduction

Preeclampsia is a pregnancy-related condition characterized by high blood pressure and proteinuria after 20 weeks of pregnancy.[1] It's a multiorgan disorder with no recognized cause.[2] It's one of the most prevalent pregnancy problems, and it's a leading cause of maternal and foetal mortality and morbidity.[3] It is the 2nd significant cause of maternal mortality and morbidity in underdeveloped nations, complicating 7-10% of all pregnancies.[4]

In patients with hypertension with a normal heart, cardiac failure with pulmonary edoema can develop. Pregnant women, especially those who are pre-eclamptic, are more likely than non-pregnant women to

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suffer pulmonary edoema. Preeclampsia is also known to be a risk factor for peripartum cardiomyopathy and subsequent cardiovascular disease.[5]

Only the presence of a placenta causes preeclampsia. Abnormal wave patterns suggesting inadequate uterine perfusion are largely a result of placental implantation when one uterine artery is the primary source of the intervillous flow, according to noninvasive doppler velocimetric examinations of the uterine arteries in the second trimester.[6]

In the majority of individuals with aberrant flow velocity waveforms, the placenta is positioned laterally. In light of these findings, we devised prospective research to observe if the lateral placement of the placenta as detected by ultrasound at 18-24 weeks of pregnancy may be used to predict preeclampsia.[7]

To be effective, a screening test must be accurate, inexpensive, and easy to administer. It should improve the prediction value, and preventative actions should be effective. Good prenatal care, followed by appropriate treatment, will undoubtedly aid the mother and the baby in achieving a positive outcome.

Materials and Methods

Study design: Random prospective observational study

Study Setting: Department of Obstetrics and Gynaecology, Shadan Institute of Medical Sciences and Research Centre

Study Duration: 14 February 2022 to 30 August 2021

Study population and Size: 100 Pregnant women attending the Obstetrics and gynecology department.

Inclusion Criteria:

- Patients with gestational age between 18 to 24 weeks.

Exclusion Criteria:

- h/o chronic hypertension, Diabetes Mellitus, Renal disease

- BP >140/90 mm Hg

- Evidence of proteinuria

Pregnant women with Rh Negative, past h/o pre-eclampsia, and family members with h/o pre-eclampsia were also included in the research.

At 18-24 weeks, ultrasonography was used to determine the position of the placenta in all 100 women. When the placenta was evenly divided across the right and left sides of the uterus, regardless of anterior, posterior, or fundal location, it was categorized as central.

It was defined as unilateral right or left placenta when 75 % or more of the placental mass was on one side of the midline. The study's end point was either the onset of hypertension according to ACOG guidelines or the delivery.

Routine prenatal appointments were followed up on for signs and symptoms of pre-eclampsia, including blood pressure, serial weight, edoema, and pre-eclampsia investigations where necessary, with the results recorded. The mode of delivery as well as the foetal fate were documented.

Statistical Analysis: The SPSS 22 software was used for statistical analysis. The data was presented in the form of means and percentages.

Observation and Results

Table 1: Distribution based on Age group

Age in years	Frequency	Percentage
≤ 20	20	20%
21-25	52	52%
26-30	20	20%
>31	8	8%
Total	100	100%
Mean ± SD	23.53 ± 3.15 yrs	

The majority of the patients belonged to the age group of 21 to 25 yrs with incidence of 52%, followed by <20 yrs and 26 to 30 yrs age group in 20% of the cases each, least belonged to the age group of >31yrs with 8% cases. The mean age group was 23.53 ± 3.15 yrs.

The association between maternal age and the incidence of pre-eclampsia demonstrates that young primigravida have a greater incidence than older primigravida. Preeclampsia was common in the research group between the ages of 20 and 25, and it was prevalent above the age of 30.

High incidence of pre-eclampsia in primigravida (81%) than in multigravida (19%)

Table 2: Distribution of patients according to severity of pre-eclampsia in study and control group

Type of pre-eclampsia	Study group	Percentage

Mild Pre-eclampsia	13	92.85%
Severe Pre-eclampsia	1	7.14%
Total	14	
Eclampsia according to Risk		
Low risk	9	64%
High risk	5	26%

According to the severity of pre-eclampsia, In the study group, 13 patients had mild preeclampsia and 1 patient had severe preeclampsia.

Out of 14 patients with preeclampsia, 64% pre-eclampsia was seen in low risk patients and 26% pre-eclampsia was seen in high risk patients.

Table 3: Relationship of placental position and development of pre-eclampsia in high and low risk women

Placental Position	Developed pre-eclampsia	Normotensive
Central (n=76)	3(21.42%)	73(84.88%)
Lateral (n=24)	11(78.57%)	13(15.11%)
Placental Position in high risk		
Central (n=18)	1(20%)	17(94.44%)
Lateral (n=5)	4(80%)	1(5.55%)
Placental Position in low risk		
Central (n=58)	2(22.22%)	56(82.35%)
Lateral (n=19)	7(77.77%)	12(17.64%)

Around 11 patients in the lateral placenta group developed pre-eclampsia which accounted for 78.57% of all pre-eclamptics. 4(80%) patients in the lateral placenta group developed pre-eclampsia in the high risk group. 5(77.77%) patients in the lateral placenta group developed pre-eclampsia in the low risk group. p-value is <0.001 and is highly significant. Most patients developed pre-eclampsia between gestational age of 36 to 40 weeks indicating that the incidence is higher in later part of gestation

Table 4: Distribution based on sensitivity and specificity

Statistic	Value
Sensitivity	81%
Specificity	85%
Positive Likelihood Ratio	5.4
Negative Likelihood Ratio	0.223

Statistic	Value
Positive Predictive Value (*)	47.2%
Negative Predictive Value (*)	96.43%
Accuracy (*)	81.27%

This screening test has Sensitivity of 81%, Specificity of 85.3%, Positive predictive value of 47.2%, Negative predictive value of 96.43%, p value <0.001 which is significant.

Discussion

Preeclampsia is a multi-organ systemic clinical condition that continues to be the leading cause of maternal and neonatal mortality and morbidity. The quest for the perfect prediction test and preventative strategy continues to be arduous.

Unfortunately, compared to advancements achieved in eradicating other catastrophic medical conditions, there has been little success in predicting this disorder. The scope of the problem, as well as the repercussions for the mother and the newborn, must be highlighted and updated, particularly in developing nations where the occurrences are high. The enormous expense of critical care for the mother, the infant, and the long-term complications in the preterm or intrauterine growth restricted baby will tend to have an impact on health systems unless effective preventative strategies are developed and implemented. The quest for the optimum prediction test and preventative measures continues to be arduous. Regardless of whether the placenta is laterally placed, the majority of the time, one of the uterine arteries meets the uteroplacental blood flow demands, with some help from the other uterine artery via collateral circulation. The degree of collateral circulation may not be the same in all women, and a lack of contribution may render preeclampsia, IUGR, or both quite probable.[8] Normal placentation is critical for cytotrophoblastic invasion, because cytotrophoblasts in preeclampsia do not develop a vascular adhesion phenotype. When the uteroplacental blood flow demands are mostly satisfied by one side uterine artery, this might explain why trophoblastic invasion is minimized in laterally located placentas.

The prevalence of pre-eclampsia in this study was 14% which is similar to previous studies with 14%,[9] and another study with 13.6% prevalence of pre-eclampsia.[10]

This study result concurs with Kofinas et al., who observed that women with a unilateral placenta had a 2.8-fold higher risk of preeclampsia than those with a centrally located placenta.[11] The current study's findings were also comparable to those of Kalanithi et al., who reported that the development of PIH and IUGR pregnancies was about fourfold higher in lateral placentation.[12]

Females with a laterally placed placenta are five times more likely to develop PIH, therefore these pregnancies may require circumspect obstetric management to obtain a better outcome and minimize preeclampsia-related maternal and neonatal illness and mortality.

Conclusion

The study concludes that, among several screening tests, placental position assessed by ultrasonogram between 18 and 24 weeks of pregnancy is a good screening technique for the prediction of pre-eclampsia since it is simple and easy to conduct, inexpensive, and included in the anomalies scan. The procedure is painless and convenient for the patient.

Lateral placentation aids in the identification of the individuals particularly at risk, allowing them to be included in a primary prevention programmes.

Ethical Clearance: Ethical Clearance was obtained from institutional ethics committee.

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References

1. Walker JJ. Current thoughts on the pathophysiology of preeclampsia/eclampsia. In: Studd J, editor. Progress in obstetrics and gynecology. Edinburgh: Livingstone-Churchill; 1998. pp. 177–188.

2. Cunningham FG, Leveno KJ, Bloom SL, et al. Williams obstetrics. 22nd ed. New York: McGraw-Hill; 2005. p. 761–808.

3. Fleischer A, Schulman H, Farmakides G, et al. Uterine artery Doppler velocimetry in pregnant women with hypertension. Am J Obstet Gynecol. 1986;154:806–813.

4. Schulman H, Winter D, Farmakides G, et al. Pregnancy surveillance with Doppler velocimetry of uterine and umbilical arteries. Am J Obstet Gynecol. 1989;160:192–196.

5. Campbell S, Bewbey S, Cohen-overbeek T. Investigation of the uteroplacental circulation by Doppler ultrasound. Semin Perinatol. 1987;11:362.

6. Pai Muralidhar V, Pillia J. Placental laterality by ultrasound—a simple yet reliable predictive test for preeclampsia. J Obstet Gynecol India. 2005;55:431–433.

7. Sankaran S, Kyle PM. Aetiology and pathogenesis of IUGR. Best Pract Res Clin Obstet Gynaecol 2009;23(6):765–77

8. Venkataramana S, Padmaja G. Placentral Laterality by Ultrasound- a simple yet reliable predictive test for pre-eclampsia. Indian J of App Res. 2015;5:778- 80

9. Kaku R, Shivaraju P, Vimala K R, Lingegowda K. Lateral location of placenta on ultrasound as a predictive test for preeclampsia. Int J Reprod Contracept Obstet Gynecol 2017;6:930-3

10. Patel A, Dabhadkar S, Taralekar V, Wagh G. 2012. Placental Laterality and Uterine Artery Resistance for Prediction of preeclampsia. Indian J of App Res. 2012;2:118-9.

11. Kofinas AD, Penry M, Swain M, et al. Effect of placental laterality on uterine artery resistance and development of preeclampsia and intrauterine growth retardation. Am J Obstet Gynecol. 1989;161:153–169.

12. Kalanithi LE, Illuzzi JL, Nossov VB, et al. Intrauterine growth restriction and placental location. J Ultrasound Med 2007; 26:1481–9

Study of Colostrum Composition in Lactating Women with Anemia

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Abstract

Background: Colostrum is a pre-milk substance, thick lemon yellow coloured viscous mammary secretion, that is produced immediately after birth, during the first 1-5days of the lactation. Pregnancy induced Anaemia (PIA) is the most common complication of pregnancy in the India. PIA is defined as blood hemoglobin level of less than 11 gm % (WHO). In India, ICMR defines anaemia as hemoglobin less than 10 gm %. it is commonly due to maternal malnutrition resulting in deficiencies of iron, anti anemic factors, folic acid and vitamin B12. Maternal nutritional status has been found to influence the composition of milk, leading to conditions which alters the total proteins, calcium and IgA concentration of the colostrum.

Aim and. Objectives: The aim of this study is to compare the composition of following biochemical parameters (total proteins, triglycerides, immunoglobulin A, lactose and calcium) in colostrum of normal pregnancy and pregnancy with anaemia patients, in primigravida, to find out whether there are any significant changes.

Materials and Methods: We included a total of 60 lactating women from the postnatal wards of Owaisi hospital /princess Esra hospital, Hyderabad after obtaining their consent. Out of which 30 were Controls (Group A) and 30 lactating anemic women (Group B). Approximately 5ml of colostrum was collected from a single breast within 24 hours of delivery from each subject into sterile storage vials and stored at –20°C and were analyzed within two weeks. The following parameters were analyzed in each sample of colostrum, total proteins, triglycerides, Ig A, lactose and calcium.

Statistical Analysis: The data was analysed using SPSS software version 17.0 descriptive results are expressed as mean and SD of various parameters in both the groups. p value less than 0.05 was considered as significant and value above 0.05 was considered as non-significant.

Discussion & Conclusion: Colostrum is a dynamic, multi-faceted fluid containing nutrients and bioactive factors needed for infant health and development. Nevertheless, knowledge of human milk composition is increasing, leading to greater understanding of the role of human milk in infant health and development, which can be extremely beneficial for preventive and protective aspects of peadiatrics and neonatology. Human milk also contains many hundreds to thousands of distinct bioactive molecules that protect against infection and inflammation and contribute to immune maturation, organ development, and healthy microbial colonization. Therefore, neonates

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who are effected and deprived of essential components of colostrum due to anaemia during pregnancy should be provided with the necessary supplements and protection from infections.

Key-words: colostrum, total proteins, triglycerides, calcium, immunoglobulin A, lactose, lactating women.

Introduction

Colostrum is a pre-milk substance, thick lemon yellow coloured viscous mammary secretion, that is produced immediately after birth, during the first 1-5days of the lactation.

The important functions of breast milk are nutritional immunological, behavioural and economic. It provides all the essential components of nutrition required by the neonate like high quality of proteins, fats, carbohydrates (lactose), minerals, electrolytes, vitamins and many anti-infective agents such as immunoglobulins which protect the newborn from infections. so, presence of higher quantities of immunoglobulins in colostrum when compared to mature milk is beneficial for the newborn.[1-3]

The biochemical composition of human milk makes it the best infant food during the first 6 months of life and with supplementation for months thereafter. About 150-300ml of colostrum is secreted by the lactating mother in 24hrs during the first 1-5 days of postpartum period.[4-6]

Colostrum (1-5 days) provides 58 Kcal/100 ml of energy, Transitional milk (6-14 days of postpartum) provides 74 Kcal /100 ml of energy, whereas Mature milk, which is considered to be after 14 days of postpartum, provides about 71 Kcal/ 100 mL, of energy.[7-9]

A dynamic, bioactive fluid, human milk changes in composition from colostrum to late lactation, and varies within feeds, diurnally, and between mothers. Human milk provides the normative standard for infant nutrition. Nevertheless, many micronutrients vary in human milk depending on maternal diet and body stores (see article in this issue by Valentine and Wagner, 2012), including vitamins A, B1, B2, B6, B12, D, and iodine.[10]

Human milk composition is dynamic, and varies within a feeding, diurnally, over lactation, and between mothers and populations. Influences on compositional differences of human milk include maternal and environmental factors and the expression and management of milk. Certain maternal conditions like eclampsia, diabetes and anemia can affect the composition of colostrum. Pregnancy induced Anaemia (PIA) is the most common complication of pregnancy in the India. PIA is defined as blood hemoglobin level of less than 11 gm % (WHO). In India, ICMR defines anaemia as hemoglobin less than 10 gm %. it is commonly due to maternal malnutrition resulting in deficiencies of iron, anti anemic factors, folic acid and vitamin B12. Maternal nutritional status has been found to influence the composition of milk, leading to conditions which alters the total proteins, calcium and IgA concentration of the colostrum.

Aim & Objectives

The aim of this study is to compare the composition of following biochemical parameters (total proteins, triglycerides, immunoglobulin A, lactose and calcium) in colostrum of normal pregnancy and pregnancy with anaemia patients, in primigravida, to find out whether there is any significant changes.

Materials & Methods

Sample Size: We included a total of 60 lactating women from the postnatal wards of owaisi hospital /princess esra hospital, Hyderabad after obtaining their consent. Out of which 30 were Controls (Group A) and 30 lactating anemic women (Group B).

Sampling Procedure: Approximately 5ml of colostrum was collected from a single breast within 24 hours of delivery from each subject into sterile storage vials and stored at –20°C and were analyzed within two weeks. The following parameters were analyzed in each sample of colostrums, total proteins, triglycerides, Ig A, lactose and calcium.

Inclusion Criteria: lactating women with and without anemia were included.

Exclusion Criteria: GDM, PIH and Other

pregnancy related complications (medical or gynaecological)

Informed Consent: Patients fulfilling the selection criteria were informed about the purpose and nature of the study and were enrolled after obtaining a written informed consent.

Biochemical Analysis: Total proteins, triglycerides, Ig A, lactose and calcium were estimated in the stored sample. Total proteins were estimated by Biuret method, Triglycerides by GPO-PAP method, Immunoglobulin A by immunoturbidimetric method, lactose by benedict's quantitative method and calcium by Arsenazo III method.

Definition of case: The diagnosis of anaemia during pregnancy was confirmed by clinicians of the department of obstetrics and gynaecology, OHRC/PEH, Hyderabad. The criteria for diagnosing anaemia during pregnancy was a hemoglobin level less than 10 g/dL.

Statistical Analysis: The data was analysed using SPSS software version 17.0 descriptive results are expressed as mean and SD of various parameters in both the groups. Independent 't' was used to calculate significance (p value) in between the groups. p value less than 0.05 was considered as significant and value above 0.05 was considered as non-significant.

Results

We included a total of 60 lactating women based on inclusion and exclusion criteria.

Table 1: Shows various parameters in study subjects during antenatal period

Parameter	Group A	Group B
SBP	120±6.5	115±5.7
DBP	79±3.1	78±3.6
Oedema	Absent	Absent
Proteinuria	Nil	Nil
Hb	10.8±0.7	7.74±0.5
FBS (mg/dL)	94±9.8	92.4±11.5
PPBS (mg/dL)	130.8±7.6	122±5.8

In the present study, the Normotensive control with mean systolic blood pressure is 120±6.5 mm. of Hg and mean diastolic blood pressure is 79±3.1 mm of Hg with no signs of oedema and proteinuria. The

mean hemoglobin concentration is 10.8±0.7 g/dl. The mean blood glucose level FBS is 94±9.5 mg/dl and PLBS is 130.7±7.6 mg/dl in control group.

In group B (Anaemic) the mean hemoglobin concentration is 7.74±0.5 g/dl. So, they have low hemoglobin concentration. Their mean systolic blood pressure is 115±5.7mm of Hg, and mean diastolic blood pressure is 78±3.6 mm of Hg and mean blood glucose level FBS is 92±14.6 mg/dl and PLBS is 122±44.2 mg /dl, with normal OGTT finding. Hence are considered as non-hypertensive and non-diabetic, representing Anaemic cases.

Table 2: Shows comparison of biochemical parameters in study subjects during antenatal period

Parameter	Group A	Group B
Total protein	6.05±0.578	4.31±0.642
Triglycerides	940±159.98	980±286.04
IgA	2.1±0.602	1.3±0.256
Lactose	4.5±0.836	4.5±0.181
Calcium	27±2.90	21.5±3.27

From the table 2 it is evident that the,

1. The mean values of total proteins are significantly lowered in Anaemia compared to control group (p<0.005).

2. Mean value of triglycerides is slightly increased in anaemia group when compared to control groups and is statistically significant (p<0.005).

3. Mean value of IgA is significantly decreased in Anaemia group when compared with control group.

4. There is no change in Mean value of lactose in Anaemia group and control group.

5. Mean value of calcium is significantly decreased in Anaemia group control groups (p<0.005).

Discussion

Colostrum plays a dual role by providing all components required for normal metabolism and also provides important nutritional, protective and immunological factors required to protect the newborn.

The present study was done on concentration of total protein triglycerides, IgA, Lactose, calcium in colostrum of 2 groups of women.

In group A: These patients were normotensive with no oedema and no proteinuria and non-diabetic and non anemic. In this group mean total protein concentration were found to be in the range of 6.05±0.578, mean triglycerides concentration were found to be 940±159.98 mean Ig A concentration was 2.1±0.602, mean lactose concentration 4.5±0.836, mean calcium concentration 27±2.90 thus suggesting to be in normal range. The results of this investigation showed values of lactose similar to those reported in earlier studies.

Group B: subjects were found to be anemic according to the criteria's mentioned above, Anaemia is the commonest complication during pregnancy in Indian women.' It is an important clinical manifestation of malnutrition and is associated with low socioeconomic status. In these lactating women, total protein concentration (4.31±0.642), mean IgA concentration (1.3±0.256), and mean calcium concentration (21.5±3.27) was found to be significantly lowered and was statistically significant (p<0.005). Mean triglycerides concentration was slightly increased (980±286.04) which is not statistically significant. The proteins present in milk are casein, lactalbumin and lactoglobulin. These are synthesized in mammary gland from amino acids derived from blood. Proteins present in colostrum provide amino acids for growth as well as aid in digestion, host defence and tissue maturation. The Triglycerides constitute the major part of the lipids present in colostrum.[11-13] Lipids are important for development of brain in neonates and have protective functions. IgA is the predominant immunoglobulin of colostrum that provides immunity against many infections which the newborn is susceptible to. Lactose is an important source of energy to the newborn. It is synthesized in the mammary gland from glucose and glycogen. Calcium in milk is partitioned between free calcium and calcium bound to citrate, casein and phosphate. It has been reported that the free calcium concentrations are relatively constant in lactogenesis. The decrease in protein contents may also be due to a corresponding decrease in Ig A contents,

indicating that malnourished status has a bearing on Ig A synthesis in the mammary gland. Therefore, it seems likely that anaemia being an important clinical manifestation of malnutrition, significantly influences the Ig A synthesis.[14-15]

In earlier studies Platt (1961)98 and more recently Yoneyama (1994)120 also found lower milk protein in malnourished women. In addition to the above complications if the colostrum is also deficient in nutritive and protective factors it further increases the morbidity and mortality in the perinatal period. Therefore, neonates who are effected and deprived of essential components of colostrum due to anaemia during pregnancy should be provided with the necessary supplements and protection from infections.

Conclusion

Human milk is uniquely suited to the human infant, both in its nutritional composition and in the non-nutritive bioactive factors that promote survival and healthy development. Human milk remains the unique and potent standard for feeding infants. Colostrum is a dynamic, multi-faceted fluid containing nutrients and bioactive factors needed for infant health and development. Nevertheless, knowledge of human milk composition is increasing, leading to greater understanding of the role of human milk in infant health and development, which can be extremely beneficial for preventive and protective aspects of peadiatrics and neonatology.

Human milk also contains many hundreds to thousands of distinct bioactive molecules that protect against infection and inflammation and contribute to immune maturation, organ development, and healthy microbial colonization. Therefore, neonates who are effected and deprived of essential components of colostrum due to anaemia during pregnancy should be provided with the necessary supplements and protection from infections.

References

1. Acker DB, Sachs BP, Friedman EA. Risk factors for shoulder dystocia. Obstet Gynecol. 1985;66:762–768.

2. Ahmed L, Nazrul Islam SK, Khan MNI, Hugue s, Ahsan M. Antioxidant micronutrient profile of Vitamin E,C,A, copper, zinc, iron) of colostrum : association with mother characteristics. J Trop Pediatr 2004; 50: 357-358.

3. Ahmed L, Nazrul Islam SK, Khan NI, Nahid SN. Vitamin C content in human milk (colostrum, transitional and mature) and serum of a sample of Bangladeshi mothers. Mal J Nutr 2004; 10 : 1-4. 581)

4. A.Kausik et al: Unusual changes in colostrum composition in lactating Indian women having medical complications during pregnancy. Indian journal of clinical biochemistry, 2002, 17(2) 68-73.

5. Allen L H.B n vitamins in breast milk:relative importance of maternal status and intake, and effects on infant status and function. Adv Nutr.2012;3(3):362-369.

6. Allen S. Cunningham, Cooperstown, N.Y.:Morbidity in breast fed and artificially fed infants II. The Journal of Pediatrics, November 1979, Vol.95, No.5, partl , pp685-689.

7. Andersson Y, Lindquist S, Lagerqvist C, Hernell O. Lactoferrin is responsible for the fungistatic effect of human milk. Early Hum Dev. 2000; 59: 95-105.

8. Aperia, A., Broberger, O., Herin, P. & Zetterstroem, R. (1979) Salt content in human breast milk during the first three weeks after delivery. Acta Paediatr. Scand. 68:441-442.

9. Ashida K, Sasaki H, Suzuki YA, Lönnerdal B. Cellular internalization of lactoferrin in intestinal epithelial cells. Biometals. 2004; 17: 311-315.

10. Beckmann CRB, Ling FW, Smith RP, et al., editors. Obstetrics and Gynecology. 5th ed. Philadelphia, PA: Lippincott Williams & Wilkins; 2005.

11. Bitman, J., Hamosh, P., Lutes, V., Neville, M.C., Seacat, J. and Wood, D.L (1989) Milk composition and volume during the onset of lactation in a diabetic mother. Am. J. Clin. Nutr. 50, 1364-1369.

12. Chemistry.Vol.32,No.1,198618.J.K.Welsh et al: Anti-infective properties of breast milk. The Journal of Paediatrics, January r979,Vol.94No.1 ,pp1-9

13. Chen Q, Bläckberg L, Nilsson A, Stenby B, Hernell O. Digestion of triacylglycerols containing long-chain polyenoic fatty-acids in vitro by colipase- dependent lipase, and bile-salt stimulated lipase. Biochim. Biophys. Acta. 1994; 1210: 239- 243.

14. Cousins L, Baxi L, Chez R, Coustan D, Gabbe S, Harris J, Landon M, Sacks D, Singh S: Screening recommendations for gestational diabetes mellitus. Am J Obstet Gynecol 165:493 -496, 1991

15. Cunningham, F.G., MacDonald, P.C., Gant, N.F., Leneno, K.J. and Gilstrap, L.C. (1993). Endocrine Disorders. In: William's Obstetrics 19th edn. Prentice-Hall International Inc. p. 1201-1227.

Child With Cerebral Palsy in Households of Two Different Economic Background: A Comparative Study

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Abstract

The objective of the study was to understand as well as to compare the psychosocio economic factors of families of two economic backgrounds with cerebral palsy child. It was a mixed method exploratory sequential design. The qualitative data was obtained from 08 parents each from monthly income Rs 10000/ and below (gr1), and monthly income Rs 30 000 and above (gr2) Quantitative data was obtained from 121 group 1 and 101 from group 2 families. The mean age of cp children was not statistically significant. 89% of group 1 belong to upper lower SES where as 67% of group 2 belonged to upper middle class. Social interaction was significantly more affected in group 1. Even these subjects were significantly more depressed. The social support was observed to be from maternal side in both the groups. There was significant difference on expenditure of the child. There was no significant difference in early intervention pattern. The groups were aware about therapy from community rather than clinicians.

Keywords: Cerebral Palsy, Economic backward, Psychological issue, Social isolation, Social support.

Introduction

Cerebral palsy is a prototype of childhood disability. These children experience varied disability and functional loss. Abnormal posture and movement being the major issues, they have developmental delay as well as functional impairment. Consequently, these children need long term care. Caregiving a disabled child far exceeds the demand financially as well as psycho socially than a normal child. [1] Persons with a stable socio-economic background may cope with the increased demand of care taking a disabled child. But the impact upon a family with low socio-economic background is much greater. More over a vicious cycle exist between poverty and disability. Poverty can cause disability and can increase the impact of disability on the family. [2] To take care of the disabled child, parents sometimes leave their job or compromise with reduction of income. Usually, young couples are not mentally prepared for the unexpected career of caregiver for a child with cerebral palsy. They experience multifaceted complex, stressful life situation. Sometimes the demand for caregiving far exceeds their ability to cope. When these parents are included in rehabilitation process of the cerebral

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palsy children, it becomes even more demanding. [3] Currently family focused therapy delivery is more appreciated for these children. Effective rehabilitation plans are based not only on medical decisions but also on other determinants of health related quality of life which includes social cultural and psychological factor. [4] India being a developing nation tries to include persons with disability in the mainstream of development. It becomes even more important to understand the predicament that families experience for upbringing a child with disability. Studies have described that socio economic factors are predictors for development of disability. But the presence of a disabled person/child in the family with lower socio-economic background in a developing country, the scenario could be different.

Objective of the Study

To explore and understand the experiences of a family with cerebral palsy child having a low and medium economic background. The study also intended to quantify the expected social, psychological and economical stressors.

Methodology

This study is a part of a PhD study under Utkal University titled Identification of risk factors for cerebral palsy: A public health concern

The study was undertaken in Swami Vivekanand National Institute of Rehabilitation Training and Research a rural based National Institute of India which deals with locomotor disability.

Design: Mixed method. Exploratory sequential design. The quantitative data was obtained by a survey questionnaire, which was prepared on themes obtained from the qualitative data by a semi structured interview.

Ethical committee approval was taken and informed consent was signed before the interview.

Participants

- **Qualitative:** 8 Parents of cerebral palsy children with monthly income Rs 10,000 and below and 8 parents with monthly income Rs 30,000 and above were selected

below from the pediatric unit of Department of Physiotherapy of SVNIRTAR were selected purposively for qualitative data. A questionnaire was prepared and validated on psycho socio economic issues of families of cerebral palsy children.

- **Quantitative:** Quantitative data was taken from 121 parents of cerebral palsy children with monthly income Rs 10,000 and below hundred and one parents whose monthly income was more than thirty thousand and above, who reported Swami Vivekanand national institute of rehabilitation training and research which is a tertiary care center on locomotor rehabilitation.

Procedure

- **Qualitative:** For qualitative study a semi structured interview was conducted. The open-ended questions were

  1. How is the social life affected after the diagnosis/birth of the special child?

  2. What are the thoughts that come usually to your mind in connection with this special child?

  3. What do you do to boost your mind?

  4. How are your financial aspects affected?

  5. When did you first know about the child's condition and describe the time elapsed between knowing and starting therapy?

Field notes were taken as well as recording was done. Member checking was done to confirm the validity of the content. Data was read several times and coding was done which was organized latter. Then categories were created which were merged into themes. Based on the various themes the questionnaire was prepared and the options for the answers were also derived from the categories recognized.

- **Quantitative:** Based on the categories and themes the survey questionnaire was made. Reviewed by two professionals with 15 to 20 years experience in this field. A pilot study was done and few changes were made on the wording and presentation of questions. The questionnaire was filled up by parents of cerebral palsy children. For analysis purpose

the data was divided into two groups as per the monthly (group1 monthly income Rs 10,000 and below and group 2 monthly income Rs 30,000 and above. Socioeconomic status was calculated later as per modified kuppuswami socio economic status scale which has three components, occupation of the head of the family, education of the head of the family and total monthly income of the family.

Results

The mean age of children in group 1 was 27.8 months and in group 2 was 31.2 months. The difference was not statistically significant.

In group1, 89% were from rural area and rest urban where as in group 2, 73% were rural dwellers and rest urban.

Care giver's age was between 20-30 yrs in 92.5% and 82.35% in group1 and group 2 respectively. In lower economic group two care givers were found to be in age group 40-50 and even 50-60.

In group 1, 80.99% belonged to SES 3 (lower middle) and rest 19% SES 4 (upper lower) whereas in group 2, 63.65% were from SES 2 (upper middle) and 16.6% were from SES 3 (lower middle) and 3.9% each from SES1 (upper) and SES4 (upper lower). No one was from SES 5 (lower) in either of the groups.

The results of the qualitative data revealed the domains as social isolation, need of social and family support, psychological issues, financial constraints, lack of awareness, physical burden.

SOCIAL ISOLATION AND SOCIAL SUPPORT

Group 1: On social isolation a mother from lower economic background expressed her cause of loneliness more of social stigma and physical burden as stated below

"Whenever people see my child, they go away from me. They don't help me. As my child is not able to stand & walk, I have to carry him in my lap, wherever I go. His weight is more now. And I cannot carry him for prolonged time because I have back pain."

Group 2: Whereas in group2, reason for social isolation was concern for the treatment of the child, as stated below.

"I do not attend function. I concentrate on therapy and treatment of the child. I do not bother about the events and other things. My parents and in laws are not happy as I spend all my finance and time on my child. I have less contact with them also."

Quantitatively: The social interaction affected was expressed in 0-100 visual scale. There was a significant difference in social interaction (p=.000). In group 1 it was significantly more affected than group 2. But if the difference is conceptualized the difference is only 5% which is not seems to be practically different. Similar is the amount of social support available to the parents. Only 2% between group difference was found. This difference was statistically significant (p=.002). It was observed that the social support was often from maternal side of the child.15.7% in group1 and 48.03% from group 2.
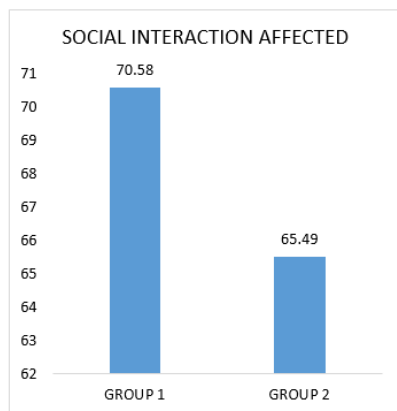
Graph 1
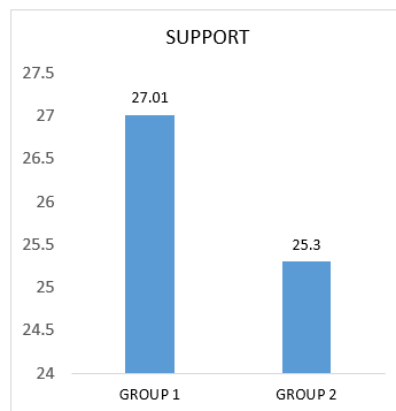
Graph 2

Differences in the economic and psychological parameters were also observed from the qualitative

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data in the families of two economic background as stated below.

PSYCHOLOGICAL ISSUES

It was observed that, apart from financial constraint there was an attitude of peer comparison giving rise to stress and misery in lower economic group. Regrets and gender discrimination was also obvious in this group. Whereas in the group with better socioeconomic status anxiety, thoughts about future, guilt of not doing the role playing well for other members of family was more eminent. Both the groups mentioned that extra health issues in the family are difficult to deal with.

Group 1: "My child & my brother's child are of same age. My child is not able to sit while his child

I die? She cannot speak / walk. When everything will become normal?"

"I have 2 children. Other child is normal. I feel sad that I am not able to take care of the other. I cannot help him in his studies though he is normal as most of my time is spent in taking care and doing all ADLS of this child.

"I feel very stressed. I do not sleep well. Always thoughts come to me. I often get irritated. I have dizziness."

"I have working hours from morning 10 am to evening 5 pm. I get very stressed due to this hectic schedule. I have kept attendant to take care of the child but at work place I cannot concentrate and I get worried for my child.
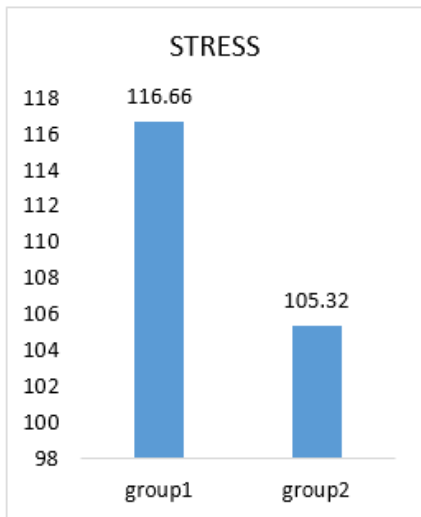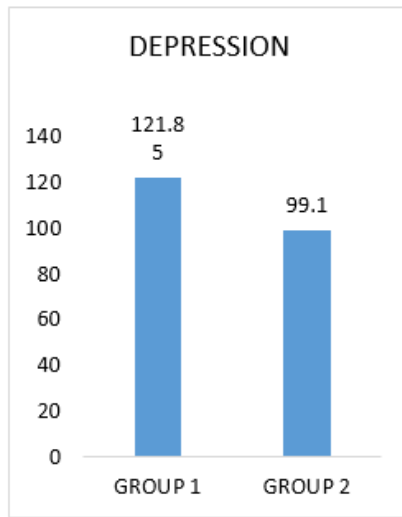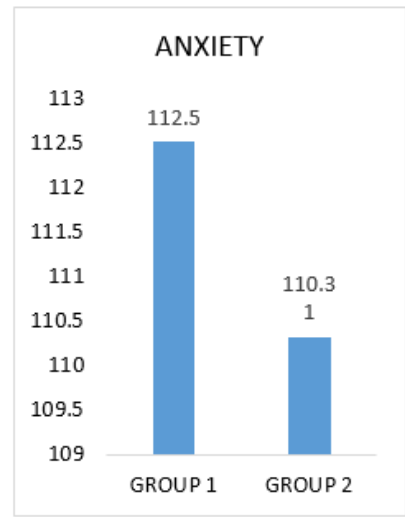
| Graph – 3 | Graph – 4 | Graph – 5 |

The psychological parameters were not related to yearly income of the family. Kendal tau .058 (p=.246) Psychological parameters were significant but weakly related to how much social life was affected Kendal tau =.229 (p=.000), and also weakly related to how much social support the parents get Kendal tau = .201 (p=.001).

FINANCIAL CONSTRAINTS

Group 1: Financial constraints were more in group1 as observed in qualitative data. Parents were on loan. Some of them sold their property / belonging for the treatment of the child.

"Expenditure is more than income especially because of the health issues of the child. I have taken

Rs 50, 000 loan from money lenders with an interest of 10% per year"

"My family supports me Rs 2000 per month."

"Friends have lent me some money and I have come here for treatment of my child."

Quantitative data showed 40% had taken loan and 7% sold their property or belonging.

Group 2: I have left my job because of child's health. Does not matter our concern is child should walk. My parents are supporting financially at the time of need.

Quantitatively: There was no significant difference between the groups in expenditure (by

independent t test) on child just after birth (p=.289). However, group 1 could spend significantly less on child thereafter r (p=.017).

EARLY INTERVENTION

Group 1: The following expression was seen in **Qualitative** data.

We took the child to the hospital many times. Doctor gave medicines and told medicines and oil massage make him alright. So, now the child is at 10 years and since 10 years we are giving him the medicines but there was no improvement. I came to know about this place from Anganwadi worker.

Quantitatively: 75% came to know about therapy for treatment of their child from acquaintance, 18% from physician and 7% from other sources. The mean age at which therapy started for group 1 was 20.20 months.

Group 2: "We took the child to the hospital for about 20 times as he was not developing like other children. Privately when we were showing he did not tell us about physiotherapy but from government hospital we came to know about this place."

Quantitative data showed that 66% were aware about therapy by acquaintance, 20% from physician and 13.72% explored themselves.

The mean age at which therapy started for the child was 23.39 months in group.

There was a difference of 3 months to start therapy between both groups, which is statistically significant. (p=.001).

Discussion

The overall results of the study showed, there were psycho socio-economic issues in the families with a cerebral palsy child in both the groups. Social interaction was more affected in lower economic group. Whereas they wear getting more social support. Depression was more in lower economic group. This group spent less on the child.

Parents had to compromise with their income by leaving job taking a part time job as described by the qualitative data. This finding is similar to a qualitative study done by Nimbalkar et al. (2014) convergence was observed in qualitative as well as

quantitative data for expenditure on treatment of the child. [5] Financial constraints were observed in the qualitative data with a similar presentation in the quantitative data with 86% were taking some type of financial support in group 1 and 12.78% in group 2. More ever 40% on loan and 7.4% sold property/belonging. Results of financial constraints were also observed by studies. [6] Differences in treatment expenditure on child was also observed between the two groups. There was a statistically significant difference in the yearly income of both the groups. The groups were made as per their income, the education and occupation of the head of the family was considered later to calculate SES. It was found that in group 1, 76.85% were from upper lower class where as in group 2, 76. 2% were from upper middle class. In both the groups the families were from lower middle class 23.12% in group 1 and 16.83% in group 2. The difference in spending showed the spending capacity of upper lower class and upper middle class on their cerebral palsy children.

The psychological barriers of caregiving were mostly depression anxiety and stress anxiety [7,8] similar to what was observed in our study and which were evident in both groups. Both the groups showed different levels of anxiety, stress and depression. But Depression was significantly more in families with lower socioeconomic background The causes could be in upper middle class people were more educated. Educated parents might have better acceptance .More ever in upper lower class financial constraints was more which is thought to be contributing towards depression. Similar findings were there in studies of Power R et al. (2019). [9] This may be because of the fact that as the socio-economic status was better in group 2, there were more educated parents with better financial condition. This might be the cause of the difference. More ever similar observation was done by a Turkish study, who described with increasing education and income the quality of life of the mothers increased whereas depression decreased. [10] This observation was also similar to a study done by Barbara Gugla et al. (2021) who described poor economic status of the family is associated with intensity of anxiety and depression. [11] A study by Catherine Marx et al. described excessive day time sleepiness in caregivers of cerebral palsy children was

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statistically related to high levels of depression. [12] Depression was manifested as an important predictor of caregiver's burden. A long-lasting situation leads to depressive symptoms. [13]

In this study there was no statistically significant difference between the two groups in stress and anxiety. This could be because all the parents were equally anxious for the future of their child. A common question from all the parents from both the groups was "Will my child be able to do his own work?" Usually, a person is stressed when he/she feels the demand exceeds their capacity. Maybe coping strategies adopted by parents were equally distributed in both the groups.

Psychological parameters were weakly related to social interaction and social support. This may be due to the fact that social interaction and social support were the one among many predictors of psychological parameters. A complex interacting effect of many other factors like years of care giving, child's health and behavioral issues, parents physical wellbeing, marital relationship of parents, maternal 20 psychological adjustment, mother child interaction etc. may be contributing to psychological wellbeing. [14-16]

It was observed from the study that both the economic groups started therapy for their child with a mean age of 20 months 23 months respectively. The source of their awareness about therapy was mostly from the community rather than hospital. In group 1 75.2% and in group 2 67.32% were about therapy from community. In group 1 13% explored themselves and none from group 2. This finding demands more community awareness and training of community health worker for early intervention of this condition.

Conclusion

In all income groups families with a cerebral palsy child have psychological and social issues. However, families with a cerebral palsy child having Lower income group (ses 3 and 4) face more financial constraints and depression than middle income group. (ses 2 and 3).

Policy Implication

This study highlights cerebral palsy as a public

health issue. Health professionals who deal with these children have greater responsibility as cerebral palsy requires family centered approach and caretaker's psychological issues may have impact on the treatment of these children.

Limitations

The sample consisted of a population from a tertiary care institution limiting the generalization of results.

Source of funding – Self

Conflict of Interest – Nil

Reference

1. Brehaut JC, Kohen DE, Garner RE, Miller AR et al. Health among caregivers of children with health problems: findings from a Canadian population-based study. American journal of public health. 2009; 99(7):1254-1262.

2. World Report on Disability by World Health Organization (2011–08-16). (2021). World Health Organization.

3. Burden of caregivers of children with cerebral palsy: an intersectional analysis of gender, poverty, stigma, and public policy (2020). https://bmcpublichealth. biomedcentral.com/articles/10.1186/s12889-020-08808-0

4. King S, Teplicky R, King G, Rosenbaum P. Family-Centered Service for Children with Cerebral Palsy and Their Families: A Review of the Literature. Seminars in Pediatric Neurology. 2004; 11(1):78-86. https://doi. org/10.1016/j.spen.2004.01.009

5. Nimbalkar S, Raithatha S, Shah R, Panchal DA. A Qualitative Study of Psychosocial Problems among Parents of Children with Cerebral Palsy Attending Two Tertiary Care Hospitals in Western India. ISRN Family Medicine. 2014. https://doi.org/10.1155/2014/769619

6. Jambekar AS, Padhyegurjar MS, Padhyegurjar SB et al. Impact of having a child with special needs on the psychosocial well-being of the parents: A cross-sectional study. J of mental health human behaviour. 2018; 23(2):115-119.

7. Whittingham K, Wee D, Sanders MR, Boyd R. Predictors of psychological adjustment, experienced burden and chronic sorrow symptoms in parents of children of cerebral palsy. Child: Care, Health and Development. 2012; 39(3):366-373.

8. Mobarak R. Predictors of Stress in Mothers of Children

with Cerebral Palsy in Bangladesh. Journal of Pediatric Psychology. 2000; 25(6):427-433.

9. Power R, Muhit M et al. Depression, anxiety and stress among care givers of adolescents with cerebral palsy in rural Bangladesh. Disability and rehabilitation. 2019; 43(15):2123-2130.

10. Tekinarslan IC. A comparison study of depression and quality of life in Turkish mothers of children with Down syndrome, cerebral palsy, and autism spectrum disorder. Psychol Rep. 2013; 112(1):266-87.

11. Gugała B. Caregiver burden versus intensity of anxiety and depression symptoms in parents of children with cerebral palsy as well as factors potentially differentiating the level of burden: a cross-sectional study (Poland). BMJ Open. 2021; 11(6):e036494.

12. Marx C, Rodrigues EM, Rodrigues MM, Vilanova LCP. Depressão, ansiedade e sonolência diurna em cuidadores primários de crianças com paralisia cerebral. Revista Paulista de Pediatria. 2011; 29(4):483-488.

13. Marrón EM, Redolar D, Boixadós M, Nieto R et al. Burden on Caregivers of Children with Cerebral Palsy: Predictors and Related Factors. Universitas Psychologica. 2013; 12(3):767-777.

14. Breslau N, Staruch KS, Mortimer EA. Psychological distress in mothers of disabled children. Am J Dis Child. 1982; 136(8):682-686.

15. Olawale OA, Deih AN, Yaadar RK. Psychological impact of cerebral palsy on families: The African perspective. J Neurosci Rural Pract. 2013; 4(2):159-63.

16. Lima MBS, Cardosa VS, Silva SSC. Parental stress and social support of care givers of children with cerebral palsy. Paideia. 2016; 26(64):207-214.

A Study to Assess the Effectiveness of the Inspiratory Muscle Training Program on level of Dyspnea among Heart Failure Patients Attending Cardiac Tertiary Care Centers, Maharashtra

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Abstract

Background of the study: Dyspnea is defined as an uncomfortable sensation in breathing, it is a cardinal symptom for cardiorespiratory diseases. As heart failure progresses, dyspnea becomes increasingly troublesome for these patients and frequently worsens their quality of life. Dyspnea is more closed associated with cardiac mortality rate than angina.[1]

Inspiratory muscle weakness can occur in 30% to 50% of the heart failure patients, which is associated with the reduction in functional capacity and reduction in the quality of life and poor prognosis of these individuals. Inspiratory Muscle training is an effective therapeutic approach to reduce the dyspnea and muscle fatigue of heart failure patients, promoting their sense of independence and psychosocial health.[2]

Problem Statement: A study to assess the effectiveness of the inspiratory muscle training program on level of dyspnea among heart failure patients attending cardiac tertiary care centers, Maharashtra.

Objectives: The outcome of this study was to assess the level of dyspnea and to assess the effectiveness of inspiratory muscle training on level of dyspnea among heart failure patients.

Result: The study results showed that, before the level of dyspnea in experimental group was 36.94% with mean and standard deviation of 4.33±1.25, whereas the level of dyspnea in control group was 36.06% followed by 4.4 mean and ±1.25 standard deviation. Then the effectiveness of inspiratory muscle training was found using paired t-test, the calculated t value was 15.05 with the degree of freedom 29 which shows the significant difference in the pretest and posttest level of dyspnea.

Conclusion: This study concluded that, the inspiratory muscle training program as an alternative approach, which was effective in reduction of level of dyspnea among heart failure patients.

Key Words: Inspiratory muscle training program, Heart failure patients, Level of dyspnea, Cardiac tertiary care centers.

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Introduction

Dyspnea is a common problem affecting up to half of these patients admitted to acute cardiac tertiary care hospitals and results in one quarter of ambulatory patients. Population-based studies have shown that a prevalence rate of 9 to 13% for mild to moderate dyspnea among adults, 15 to 18% among the adults aged 40 years or older and 25 to 37% of adults aged 70 years and older. Dyspnea is more closely associated with cardiac mortality rate than angina.3

Breathing exercises are representing the largest group of non-machine-assisted respiratory training. These breathing exercises are suited either to hospital or non-hospital settings. They have been shown to reduce the risk factors of cardiovascular disease using breathing modification and relaxation techniques.[4]

Inspiratory muscle training and breathing exercises are effective strategies for improving cardiac functions, exercise capacity, and quality of life in heart failure patients. Inspiratory muscle training with high pressure effectively improves cardiac function, and inspiratory muscle training with moderate pressure effectively improves quality of life among these patients. In non - hospital settings, non-machine-assisted respiratory training which include inspiratory muscle training and breathing exercise effectively improves cardiac functions among heart failure patients.[4]

NEED FOR THE STUDY

Dyspnea is common symptom. It has been reported that 7.4% of patients presenting to emergency room complain of dyspnea. Among patients in general practice, 10% complain of dyspnea when walking on flat ground and 25% complain of dyspnea on more exertion, For example in climbing stairs.[5]

The numbers of studies supporting the potential benefits of Inspiratory Muscle Training is different in patient population, it can be generally considered in clinical practice in patients with heart failure. This may be partially due to the lack of enough evidence supporting the beneficial effects of Inspiratory Muscle Training in heart failure patients.[6]

Inspiratory muscles training are series of breathing techniques that are designed to improve the performance of the respiratory muscles that may be impaired in a variety of conditions. Interest in Inspiratory Muscle Training has expanded over the past two decades and it has been used in increasingly wide range in clinical conditions. Selective inspiratory muscle training is effective in patients with chronic heart failure. Mechanisms underlying these beneficial effects of Inspiratory Muscle Training included attenuated metaboreflex, improved ventilator efficiency, and lower ventilator oscillations during incremental exercise.[2]

PROBLEM STATEMENT

"A study to assess the effectiveness of the inspiratory muscle training program on level of dyspnea among heart failure patients attending cardiac tertiary care centers, Maharashtra."

OBJECTIVES

1. To assess the level of dyspnea among heart failure patients attending cardiac tertiary care centers.

2. To assess the effectiveness of inspiratory muscle training on level of dyspnea among heart failure patients attending cardiac tertiary care centers.

HYPOTHESIS

H_0: There is no significant difference between the pre inspiratory muscle training program and post inspiratory muscle training program on level of dyspnea among heart failure patients.

Methodology

RESEARCH APPROACH

An evaluative research approach was considered for the present study.

RESEARCH DESIGN

True experimental research design, A pre-test and post-test control group design was used

Setting of the study

The present study was conducted in selected Cardiac Tertiary Care Center, Maharashtra.

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Population

The heart failure patients attending selected cardiac tertiary care centers, Maharashtra.

Sample

In the present study the samples were heart failure patient diagnosed by cardiologist and physically fit to perform inspiratory muscle training program for the present study.

Sample Size

The sample size was 60 heart failure patients, among those 30 patients are assigned to experimental group and 30 patients are assigned to control group randomly.

Sampling Technique

In this study the simple random sampling technique was used.

VARIABLES

Variables under the study are as follows:

Independent Variable: In this study it refers to inspiratory muscle training program for heart failure patients on level of dyspnea.

Dependent Variable: In the present study it refers to the level of dyspnea among heart failure patients attending cardiac tertiary care centers.

Socio - Demographic Variables: They are age in year, gender, diagnosed as cardiac disease since, History of respiratory illness, regular exercise, duration of exercise, habits, regular medication and type of diet.

Description of Tool

The final tool was used in this study consist of inspiratory muscle training program it consists of two parts. They are as follows;

SECTION A: SOCIODEMOGRAPHIC VARIABLE

It consists of Age in year, Gender, Diagnose as cardiac disease since, History of Respiratory illness, Regular exercise, Duration of exercise, Habits, Regular Medication, Type of Diet.

SECTION B: INSPIRATORY MUSCLE TRAINING PROGRAM

It consists of two parts;

In that **Part I** consist of Modified Borg Dyspnea Scale to assess the level of dyspnea among heart failure patients

Part II consist of Inspiratory Muscle Training Program

Part I: Modified Borg Dyspnea Scale to assess the level of dyspnea among heart failure patients

Standardized Modified Borg Dyspnea Scale with 12 items was used to assess the level of dyspnea in heart failure patients. This scale asks to rate the difficulties of breathing. It starts at number 0 where breathing is causing no any difficulty at all and progresses thoroughly towards the number 10 where breathing difficulty is maximal.

Assessment of Level of Dyspnea among Heart Failure patients using Modified Borg Dyspnea Scale

Score	Level Of Dyspnea
0 – 2	Mild
3 – 6	Moderate
7 – 10	Severe

Part II: Inspiratory Muscle Training Program

It is a technique that aims to improve functions of the respiratory muscles through specific exercises. It consists of a series of breathing exercises, to increase strength and endurance of the respiratory muscles and therefore it improves respiration. It includes diaphragmatic breathing and pursed lip breathing exercise 15 minute daily for 4 weeks.

TESTING OF THE TOOL

A. VALIDITY: The validity of the tool was obtained by giving it to various experts from nursing and medical fields. A total 10 experts consisting of 2 cardiologists in cardiac tertiary care center, 1 Physiotherapist and 6 nursing experts and 1 statistician had validated the tool.

B. PILOT STUDY: Pilot study results indicated that the tool is feasible and practicable for further main study.

C. RELIABILITY: The test re-test reliability co-efficient obtained for tool was 0.91 which shows that the tool was highly reliable.

Section I: Findings related to pre-test and post-test level of dyspnea among heart failure patients in experimental group and control group.

Results

Table No. 1: Frequency and percentage wise distribution of pre-test level of dyspnea among heart failure patients in experimental and control group.

n = 60

Sr. No.	Pre-test Level of Dyspnea	Experimental Group		Control Group	
		F	Percentage (%)	f	Percentage (%)
1.	Mild	2	6.67	5	16.67
2.	Moderate	28	93.33	25	83.33
3.	Severe	0	0	0	0
Total		30	100	30	100

Table No. 1 describes that before the intervention of Inspiratory muscle training program in experimental group, 2 (6.67%) subjects had mild level of dyspnea, 28 (93.33%) subjects out of 30 subjects had moderate level of dyspnea and none of them had severe level of dyspnea. Whereas in the control group, 5 (16.67%) subjects had mild level of dyspnea, 25 (83.33%) subjects out of 30 subjects had moderate level of dyspnea and none of them had severe level of dyspnea.

Table No. 2: Frequency and Percentage wise distribution of post-test level of dyspnea among heart failure patients in experimental group and control group.

n = 60

Sr. No.	Post-test Level of Dyspnea	Experimental Group		Control Group	
		f	Percentage (%)	f	Percentage (%)
1.	Mild	19	63.33	7	23.33
2.	Moderate	11	36.67	23	76.67
3.	Severe	0	0	0	0
Total		30	100	30	100

Table No. 2 describes that after the intervention of Inspiratory muscle training program in experimental group, there are 19 (63.33%) subjects had mild level of dyspnea, 11 (36.67%) subjects had moderate level of dyspnea and none of them were suffer from severe level of dyspnea. Whereas in the control group 7 (23.33%) subjects had mild level of dyspnea, 23 (76.67%) subjects out of 30 subjects had moderate level of dyspnea and none of them had severe level of dyspnea.

Table No. 3: Mean, standard deviation, range and mean percentage of pre-test and post-test level of dyspnea among heart failure patients in experimental group and control group.

n = 60

Sr. No.	Level of Dyspnea	Max	Pre-test level of Dyspnea				Post-test level of Dyspnea			
			Range	Mean	SD	Mean %	Range	Mean	SD	Mean %
1.	Experimental Group	12	2-6	4.33	1.25	36.94	1-4	2.13	1.00	17.77
2.	Control Group	12	2-6	4.4	1.45	36.66	2-6	3.9	1.34	32.5

Table No. 3, Summarizes that the pre-test and post-test mean, standard deviation and range of level of dyspnea in experimental group and control group.

In the pretest, in the experimental group the mean percentage of level of dyspnea was 36.94% with mean and standard deviation of 4.33±1.25, in

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the control group 36.66% with mean and standard deviation of 4.4 ±1.45.

In the post test, in experimental group, the mean percentage level of dyspnea was 17.77% with mean and standard deviation 2.12±1.00. In the control group the mean percentage level of dyspnea was 32.5% with mean and standard deviation of 3.9±1.34.

Section II: Findings related to effectiveness of inspiratory muscle training program in terms of difference of pre-test and post-test level of dyspnea among heart failure patients in experimental and control group.

Table No. 4: Comparison between pre-test and post-test level of dyspnea among heart failure patients in Experimental Group

n = 60

Sr. No.	Level of Dyspnea	Max	Experimental Group				Paired t-test
			Range	Mean	SD	Mean %	
1.	Pre-test	12	2-6	4.33	1.25	36.94	15.05,
2.	Post-test	12	1-4	2.13	1.00	17.77	df = 29, p<0.05, S
3.	Difference	12	1-4	2.3	2.41	19.17	

(p = level of significance, df = degree of freedom, S = significant)

The table no. 4, describes the effectiveness of inspiratory muscle training program on level of dyspnea among heart failure patients among the experimental group, the mean percentage difference was 19.17% with mean and standard deviation of 2.3±2.41. The paired t-test value was 15.05, df = 29 shows significance regarding inspiratory muscle training program. (t-table value = 2.05 for df = 29) hence calculated value is greater than table value, hence we reject the null hypothesis. Hence there is significant difference in the pre-test and post-test level of dyspnea.

Table No. 5: Comparison between pre-test and post-test level of dyspnea among heart failure patients in control group

n = 60

Sr. No.	Level of Dyspnea	Max	Control Group				Paired t-test
			Range	Mean	SD	Mean %	
1.	Pre-test	12	2-6	4.4	1.45	36.66	5.38,
2.	Post-test	12	2-6	3.9	1.34	32.5	df = 29, p<0.05, S
3.	Difference	12	0-1	0.5	0.70	4.16	

(p = level of significance, df = degree of freedom, S = significant)

The above table no. 5, describes the effectiveness of inspiratory muscle training program on level of dyspnea among heart failure patients among the control group, the mean percentage difference was 4.16% with mean and standard deviation of 0.5±0.70. The paired t-tests value was 5.38, df = 29, S. (t-table value = 2.05 for df = 29) hence calculated value is greater than table value, hence we reject the null hypothesis. Hence there is significant difference in the pre-test and post-test level of dyspnea.

Conclusion

Findings related to Pre-test level of dyspnea in heart failure patients among experimental group and control group.

Before the intervention of Inspiratory Muscle Training Program in experimental group, 2 (6.67%)

subjects had mild level of dyspnea, 28 (93.33%) subjects had moderate level of dyspnea and none of them had severe level of dyspnea. Whereas in the control group, 5 (16.67%) subjects had mild level of dyspnea, 25 (83.33%) subjects had moderate level of dyspnea and none of them had severe level of dyspnea.

Findings related to Effectiveness of Inspiratory Muscle Training Program in terms of pre-test and post-test Level of Dyspnea in Heart Failure Patients among Experimental and Control Group.

- In experimental group, the mean percentage difference was 19.17% with mean and standard deviation of 2.3±2.41. The paired t-test value was 15.05, df = 29.

- In control group, the mean percentage difference was 4.16% with mean and standard deviation of 0.5±0.70. The paired t-tests value was 5.38, df = 29.

The presented above shown that there was significant difference in the pre-test and post-test level of dyspnea among experimental and control group, hence the stated null hypothesis is rejected.

Ethical Clearance: Ethical clearance had taken from Institutional ethical committee M.E.S. College of Nursing, Lote Khed Maharashtra.

Source of Findings: Self

Conflict of Interest: Nil

References

1. Dennis S, Larissa MS, A pilot study on aerobic exercise and inspiratory muscle training in reducing dyspnea among heart failure patients. International Journal of Science & research. 2015 January;4(1):1676 – 1683.

2. Helmy ZM, Ibrahim BS, Mohammed SH, Mohammed RA, Hassan MH, Effect of inspiratory muscle training on cardiac parameters of exercise tolerance test in chronic heart failure patients. Egyptian Journal of Occupational Medicine. 2016; 40(2):171 – 184.

3. Mark BP, Richard MS, Lewis A, Robert BB, Harold LM, Jean B, et.al. An official American thoracic society statement: Update on the mechanisms, assessment and management of dyspnea. Am J Respir Crit Care Med. 2015 Feb;185(4):435-452

4. Mei HW, Mei LY, Respiratory training interventions improves health status of heart failure patients: A systematic review & network meta–analysis of randomized controlled trials. World J Clin Cases. 2016 Sept;7(18): 2760 – 2775.

5. Sachdeva S, Pawaria S, Kalra S, Effects of pursed lip breathing and mouth mask on dyspnea in healthy individuals – A pilot study. International Journal of Health Science & Research. 2018 July;8(7):135-140.

6. Meral BG, Hulya A, Sema S, Deniz II, Erol T, Kudret A, Effects of inspiratory muscle training in patients with heart failure. Respiratory Medicine. 2011;105:1671 – 1681.

Prevalence and Awareness of Risk Factors for Hypertension among Urban and Rural High School Children in the Field Practice areas Rajarajeswari Medical College, Bengaluru: A Cross Sectional Comparitive Study

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Abstract

It is the era of non-communicable diseases (NCDs), non-communicable diseases are the leading global cause of death, causing more deaths than all others causes combined, and they strike hardest at the world's low and middle income populations. This was a school based cross-sectional study carried out with the objective of finding the prevalence and awareness of risk factors for selected Non-Communicable diseases(Hypertension, IHD and diabetes) among the urban and rural government high school students, with a sample size of 510 (255 urban and 255 rural) drawn by simple random sampling method. This study was conducted using a pre-tested, semi-structured questionnaire based on the study done by Diwakaran et al.,With modifications made to cater the need of the study. Awareness of Hypertension was 39.8%and 30.6% (statistically significant, p = < 0.001) among the rural and urban study subjects respectively. In our study, 20.1% of rural and 28.2% of urban children were consuming fast foods daily. 64.5% of rural and 60.8% of urban children were consuming Fruits and vegetables daily. There was significant difference in Fruits and Vegetable consumption pattern was observed between two groups. Similarly14.3% of rural and 27.1% of urban children were consuming Soft Drinks daily. 20.1% of rural and 20.8% of urban children thought that re-use of cooking oil is good for health, which was statistically not significant. Awareness of risk factors like Alcohol, Tobacco, Stress / anxiety, Obesity, passive smoking as risk factors for Hypertension, was significantly higher in rural areas than in urban areas as a risk factor for HTN. Were as in urban area Awareness of Fast food consumption, reuseof cooking oil was significantly higher in urban areas.

Key words: Awareness, Prevalence, Non-Communicable diseases, Hypertension.

Introduction

It is the era of non-communicable diseases (NCDs), non-communicable diseases are the leading global cause of death, causing more deaths than all others causes combined, and they strike hardest at the world's low and middle income populations[1].

It has been assessed that prevalence of non-communicable diseases are increasing rapidly and is believed to cause almost three quarters as many deaths as communicable; maternal; nutritional and

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perinatal diseases by 2020 and could also be the most common cause of death by 2030[2].

Among the death caused by non-communicable diseases, the major cause was due to

1. cardiovascular diseases (25% of non-communicable diseases deaths).

2. Diabetes also contributing with 5% of deaths due to non-communicable diseases[3].

About 80% of the coronary heart disease and cerebrovascular diseases are due to lack of physical activity, tobacco use, unhealthy diet[4].

Childhood obesity and overweight has become a global epidemic. In one of the most extreme examples from 1976-1980 to 1999-2000, the prevalence of overweight among children ages 6-11 years doubled, from approximately 6.5% to 15.3% in the United States. During the same time period, the prevalence among adolescents aged 12-19 years also increased more than three-fold from approximately 5% to 15.5%. Overweight children often become overweight adolescents and adults and overweight in adulthood is a serious health risk. However the global problem of childhood overweight increasingly extends into the developing world[5].

Objectives

1. To assess the prevalence and awareness of risk factors for Hypertension among government urban and rural high school children in the field practice area of Rajarajeswari Medical College and Hospital, Bengaluru.

2. To compare the prevalence and awareness of risk factors for Hypertension among government urban and rural high school children in the field practice area of Rajarajeswari Medical College and Hospital, Bengaluru.

Methods

A school based cross sectional study was done among 514 government high school students,

Sample size was calculated to be n = 510, with 255 urban students in Kengeri Upanagara and 259 rural students in Bidadi. which was calculated using Open Epi, using the formula:-

Sample size n = [DEFF*Np(1-p)]/ [(d2/Z21-α/2*(N-1)+p*(1-p)]

After obtaining Ethical clearance from the Institutional ethical committee, permissions from the concerned Board Education Officers (BEO of Ramanagara district for rural Government high schools, and BEO of Bangalore south for urban Government high schools), Principal/head master of concerned government high school was obtained and students assent was taken before starting the study.

By using simple random technique schools were selected and children of Government high schools who are present on the day of study were considered for the study. Information regarding socio-demographic details, awareness of selected NCDs and their risk factors were elicited using a pre-tested, semi structured questionnaire. Anthropometric measurements like height, weight, and waist hip ratio were recorded. Blood pressures were recorded using mercury sphygmomanometer. GRBS was measured using standardized glucometer (Accu Checkbrand).

Data was entered into Microsoft excel sheet and was analysed using SPSS 22 version software and expressed as percentages, proportions and graphs. Chi-square was used to find out the association between variables. Statistical significance was considered at p value <0.05.

Results

Data was entered into Microsoft excel data sheet and was analyzed using SPSS 22 version software. Categorical data was represented in the form of Frequencies and proportions. Chi-square was used as test of significance. Continuous data was represented as mean and standard deviation. Independent t test was used as test of significance to identify the mean difference between two groups. p value <0.05 was considered as statistically significant.

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Table 1: Distribution of the study subjects according to their age.

Agein years	Address			
	Rural		Urban	
	Count	%	Count	%
13	132	51.0	147	57.6
14	90	34.7	78	30.6
15	37	14.3	30	11.8
Total	259	100	255	100

Table 2: Distribution of the study subjects according to their gender.

Gender	Address			
	Rural		Urban	
	Count	%	Count	%
Male	116	44.8	102	40.0
Female	143	55.2	153	60.0
Total	259	100	255	100

In the study, both groups majority of students were in the age group 13 years i.e. 132(51%) in rural and 147 (57.6%). In our study, majority of subjects in both the groups were females i.e. 143(55.2%) in rural and 153(60%) in urban study subjects.
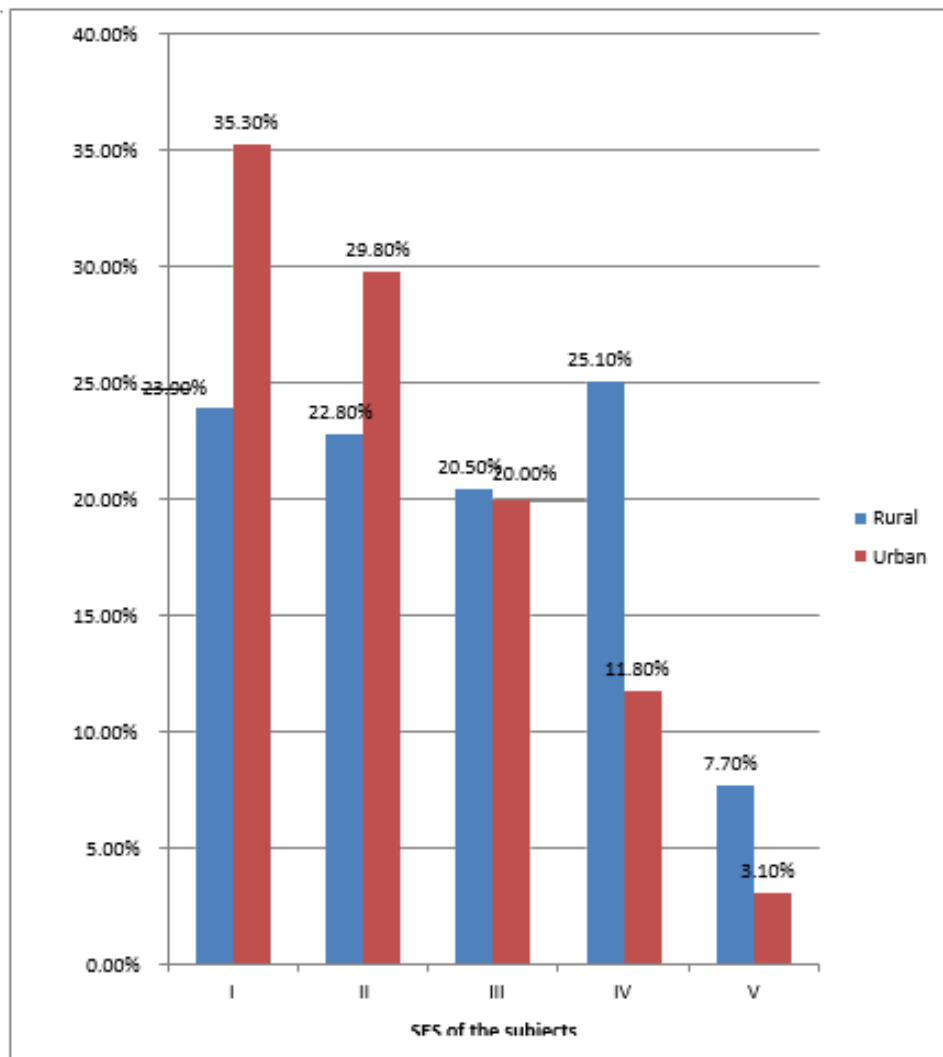
Graph 1: Bar diagram showing SES wise distribution of subjects

Table 3: Distribution of the study subjects according to their awareness on Hypertension.

		Address				p value
		Rural(n=259)		Urban(n=255)		
		Count	%	Count	%	
Aware of HTN	Yes	103	39.8	78	30.6	
	No	156	60.2	177	69.4	0.029
	No	94	36.3	108	42.4	

In the study, 103(39.8%) of rural students and 78(30.6%) of urban children were aware of HTN.

Similarly 165(63.7%) and 165(63.7%) of rural, 119(46.7%) and 147(57.6%) of urban children had awareness regarding IHD and DM respectively. Interestingly awareness regarding HTN and IHD was significantly higher in rural students than in urban areas.

Table 4: Distribution of the study subjects according to their Mean Values of Anthropometric, Blood pressure and Glucose levels.

	Address				p value
	Rural(n=259)		Urban(n=255)		
	Mean	SD	Mean	SD	
Height(mts)	1.47	0.07	1.45	0.06	0.016
Weight(Kgs)	39.88	8.87	40.2	8.7	0.684
BMI	27.01	5.44	27.51	5.25	0.289
WaistHip Ratio	0.881	0.03	0.86	0.05	<0.001
SBP	109.68	10.68	108.42	10.491	0.178
DBP	69.7	9.92	71.08	8.71	0.096
GRBS(mg/dl)	97.6	13.1	94.8	13.3	0.016

Table 5: Distribution of the study subjects according to their awareness of Risk Factors for HTN

		Address				p value
		Rural(n=259)		Urban (n=255)		
		Count	%	Count	%	
Alcohol	Present	123	47.5	62	24.3	<0.001
	Absent	136	52.5	193	75.7	
Tobacco	Present	155	59.8	89	34.9	<0.001
	Absent	104	40.2	166	65.1	
Excess salt intake	Present	127	49.0	137	53.7	0.287
	Absent	132	51.0	118	46.3	
Excess stress/anxiety	Present	118	45.6	101	39.6	0.172
	Absent	141	54.4	154	60.4	
Junk food	Present	51	19.7	62	24.3	0.206
	Absent	208	80.3	193	75.7	
Fast foods	Present	57	22.0	81	31.8	0.013
	Absent	202	78.0	174	68.2	
Lack of exercise	Present	80	30.9	95	37.3	0.128
	Absent	179	69.1	160	62.7	

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		Address				p value
		Rural(n=259)		Urban (n=255)		
		Count	%	Count	%	
Obesity	Present	90	34.7	67	26.3	0.037
	Absent	169	65.3	188	73.7	
Passive smoking	Present	94	36.3	59	23.1	<0.001
	Absent	165	63.7	196	76.9	
Reuse of cooking oil	Present	59	22.8	87	34.1	0.004
	Absent	200	77.2	168	65.9	
Use of soft drinks	Present	56	21.6	67	26.3	0.216
	Absent	203	78.4	188	73.7	

In the study awareness of Risk factors like Alcohol, Tobacco, Stress/anxiety, Obesity, passive smoking as risk factors for Hypertension, was significantly higher in rural areas than in urban areas. Whereas in urban area Awareness of Fast-food consumption, reuse of cooking oil was significantly higher in urban areas.

Discussion

Detecting the risk factors of NCDs prevalent in the population is of utmost importance to achieve a healthy population. This study was undertaken to estimate the prevalence of various risk factors prevailing among high school students and also to identify their social correlates.

The study population comprised of 116(44.8%) and 102(40%) males from rural and urban areas respectively, and 143(55.2%) and 153(60%) females from rural and urban areas respectively. Majority were in the age group of 13 years i.e. 51%(132) in rural and 57.6%(147) in urban areas. This was in accordance with the participants in the studies conducted by Kowsalya T et al., where 1088 and 810 were belonging to urban and rural area respectively. In the urban area, 797 were boys, and 291 were girls, and in a rural area, 596 were boys, and 214 were girls[6].

In our study, majority of subjects in urban area were belonging to SES of 1(35.3%) and 2(29.8%). Were as in rural area majority of them were belonging to SES of 4(25.1%). This difference in SES was statistically significant, these results were very similar in the study conducted by Ekta G et al., in an urban area in Assam, where majority of the study subjects belonged to the SES of 2 (33.7% and 43.6% in boys and girls respectively)[7], Similarly in a study done by

Bukelo et al., in a rural area of Karnataka it was noted that majority of the study subjects belonged to the SES of 5(73.7%)[8].

In the study, 39.8% of rural students and 30.6% of urban children had awareness regarding HTN. Interestingly awareness regarding HTN was significantly higher in rural students than in urban areas. Whereas in a study conducted by Anju Ade et al.,in a rural setting it was noted that awareness regarding Diabetes and Cardiovascular diseases was 54.4% and 53.2% respectively[9]. In the study by Chaudhari Al et al., in an urban setting reveled that awareness of Hypertension was 27.6% , Diabetes was 22.4% and Heart attack was 43.1%[10].

In the present study, 47.5%, of rural students and 74.5%, of urban children said that HTN, is preventable . In accordance with the study done by Anju Ade et al., majority of them (62.6%) had no knowledge about the prevention of NCDs. Only 127(37.4%) students felt NCDs are preventable. Knowledge regarding communicability of these lifestyle diseases was good among students, about 65.6% students knew that they are noncommunicable.34.4% students had no idea that the NCDs were communicable in nature[9].In the study done Divakaran B et al., A majority(47.5%) felt that among the 3 NCDs, DM could be prevented. Some students had the misconception that the NCDs were communicable in nature[11].

In the present study, it was noted that mean height of the study subjects was 1.47±0.07 in rural and 1.45±0.06 meters in urban study subjects, weight was 39.88±8.87 kgs in rural and 40.2±8.7 kgs in urban study subjects, BMI was 27.01±5.44 in rural and 27.51±5.25 in urban study subjects, and waist hip

ratio was 0.881±0.03 in rural and 0.86±0.05 in urban study subjects respectively. Very similar results were found in the study done by Kowsalya T et al.,[6]

In the present study, 0.8% rural children had SBP > 95th Percentile. There was no significant difference in SBP between two groups. Majority of the study subjects had SBP<90th percentile. 3.1% rural children and 0.8% of urban children had DBP between 90th to 95th percentiles. There was no significant difference in DBP between two groups.

This was in accordance with the study done by Mahajan A et al., where the prevalenceof hypertension in females was more i. e., 13.1% in comparison to males 9.5%.However, the prevalence of pre-hypertension was nearly equal (11.0% in females and11.3% in males) [12]. In the study done by Ekta G et al., in an urban setting in Assam among high school boys and girls; an interesting result was noted, which showed prevalence of hypertension was21.2% and prehypertension was 24.4%[7].

In the study, awareness of risk factors like Alcohol, Tobacco, Stress/anxiety, Obesity, passive smoking as risk factors for Hypertension, was significantly higher in rural areas than in urban areas as a risk factor for HTN. Were as in urban area Awareness of Fast food consumption, reuse of cooking oil was significantly higher in urban areas. This was in accordance with the study done by Shivalli S etal., among rural school children of Varanasi it was found that tobacco use, obesity and alcohol were the risk factors for Hypertension according to 54.1%, 47.4% and 46.9% of the students respectively[13].

In the study done by Anju Ade et al., it was noted that awareness of risk factors of non-communicable diseases and knowledge regarding prevention aspects of NCDs was also low among rural school children[9].

Data on the awareness of risk factors for Hypertension among Indian school children are limited.

In the present study, awareness of risk factors like Alcohol, Tobacco, stress/anxiety and passive smoking were significantly higher in rural areas than in urban areas as a risk factor for DM. Where as in urban area Fast food consumption as risk factor for DM was significantly higher in urban areas as a risk factor for DM. This was in accordance with the study done by Shivalli S et al., where only one tenth of the students considered that alcohol and sedentary life style as risk factors for diabetes[13].

Conclusions

Prevalence of risk factors for Hypertension like overweight, pre-hypertension, Waist Hip ratio and family history for these diseases were more among rural study subjects compared to that of urban study subjects. Whereas physical activity was more in rural than urban study subjects.

Awareness of risk factors like Alcohol, Tobacco, Stress / anxiety, Obesity, passive smoking as risk factors for Hypertension, was significantly higher in rural areas than in urban areas as a risk factor for HTN. Whereas; in urban area awareness of Fast food consumption, reuse of cooking oil was significantly higher in urban areas.

Recommendations: This current study shows non-Communicable diseases like Hypertension, will start in childhood itself, and the awareness of these risk factors among the government high school students in both rural and urban areas is unsatisfactory.

Students should have a curriculum based education regarding these risk factors for non-communicable diseases to increase the awareness about these risk factors and non-communicable diseases; there by emphasizing the primordial prevention.

References

1. World Health Organization .Global status on non-communicable diseases2010.Available from: http://www.who.int/nmh/publications/ ncd_report_full_ en.pdfcited 2014 Oct 27.

2. The global burden of diseases;2004 update Geneva. World Health Organization, 2008. [citedon 2014 Oct27].

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Availablefrom:http://www.who.int/healthinfo/global_burden_disease/GBD_report_2004update_full.pdf

3. Centres for Disease control and prevention. CDC global non communicable diseases. 2014. [citedon2014October17]. Availablefrom:http://www.cdc.gov/globalhealth/ncd/

4. King H, Aubeat R E, Herman W H, Global burden of diabetes, 1995-2025; Prevalence, numericalestimates & projections.Diabetescare1998;21:1414-31.

5. Kinra S, Liza J Bwen, Lyngdoh T, Prabhakaran D, Reddy KS, Ramakrishnan Let al. sociodemographic patterning of non-communicable disease risk factors inruralIndia: a cross sectional study.BMJ. 2010;341:c4974

6. KowsalyaT,ParimalavalliR.Prevalenceofoverweight/obesityamongadolescentsinurbanandruralareasofSalem,India.JObesMetabRes2014;1:152-5.

7. Ekta G, Tulika MG. Risk factor distribution for cardiovascular diseases amonghighschoolboysandgirlsofurbanDibrugarh, Assam.JFamilyMedPrimCare2016;5:108-13.

8. Bukelo MF, Kiran D, Goud RB, Bukelo MJ, Kiran PR, Kulkarni V, et al. RiskFactorsForNon-Com municableDiseasesAmongRuralAdolescents:ASchool-BasedCross-SectionalStudy. AsianJPharm ClinRes.2015;8(2):284-287

9. Anju Ade , Chethana K V , Abhay Mane , S G Hiremath Anju Ade et.al Non-communicable diseases: Awareness of risk factors and lifestyle among ruraladolescents.Int JBiol MedRes. 2014; 5(1): 3769-3771

10. ChaudhariAI,RamiK,ThakorN.Assessment of knowledge regarding noncommunicable diseases and their risk factors among students of highersecondary school: an interventional study. Int J Med Sci Public Health. (2016),[citedSeptember 13,2016]; 5(1): 115-118.

11. Divakaran B, Muttapillymyalil J, Sreedharan J, Shalini K. Lifestyle riskfactorsof noncommunicable diseases:Awareness among school children.Indian JCancer2010;47, Suppl S1:9-13

12. Mahajan A, Negi PC. Hypertension and pre-hypertension among adolescents in Shimla, NorthernIndia-Timetoawaken. NigJCardiol 2015;12:71-6.

13. Siddharudha S et al. Awareness of non communicable diseases and their riskfactors among rural school children. Indian Journal Of Community Health, Jan.2013;24(4):332–335.AvailableAt:http://www.iapsmupuk.org/journal

14. /index.php/IJCH/article/view/102.Dateaccessed: 13Feb.2016.

Effect of Antiretroviral Therapy on CD 4 cell count and WHO Staging among PLHIV Accessing Services at Tertiary care Hospital, Coastal Karnataka

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Abstract

Background: Human immunodeficiency virus attacks CD4 cells primarily. Current CD4 count is a strong predictor of the immediate risk of acquired immune deficiency syndrome or death. Antiretroviral therapy results in an improvement in immunologic status, one feature of which is an increase in the CD4 cell count.

Objectives: To study the effect of Antiretroviral therapy on CD4 cell count & WHO staging among people living with HIV/AIDS.

Methodology: A retrospective cross-sectional descriptive study was conducted using data available from Antiretroviral therapy centre attached to Teaching Hospital of Karwar Institute of Medical Sciences, Karwar.

Conclusion: Antiretroviral therapy among People Living with HIV was significantly associated with the increase in their CD4 cell count. The mean difference of the CD4 count increase in patients obtained was of 451 and is statistically significant (P < 0.01). There is improvement in the WHO staging of the disease after the start of Antiretroviral therapy.

Key words: PLHIV, Anti Retroviral Therapy,CD4 cell count, WHO staging

Introduction

India has a low HIV prevalence of 0.22%. Even with this low prevalence, in terms of absolute numbers, India has the third highest burden of HIV in the world.[1] Human immunodeficiency virus (HIV) attacks CD4 T cells primarily and the CD4 count decreases. Current CD4 count is a strong predictor of the immediate risk of acquired immunodeficiency syndrome (AIDS) or death than HIV RNA level.[2] Antiretroviral therapy has reduced HIV/AIDS morbidity and mortality significantly and has improved the prognosis for people living with HIV AIDS (PLHIV).[3]Government of India has

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launched free ART for PLHIV was since 2004.[4] CD4 cell counts are commonly used markers of HIV disease progression and for starting and monitoring antiretroviral treatment in the absence of viral load.[5] Sustained increase in the CD4 cell response to highly active antiretroviral therapy (HAART) and suppression of HIV load were both associated with greater increases in CD4 cell counts.[5] HAART results in an improvement in immunologic status, one feature of which is an increase in the CD4 cell count.[6] Inhibitory of HIV duplication is generally associated with a steady increase in the CD4 cell count and results in improved clinical outcomes. This increases the chances of survival for HIV infected patients.[7]

Objectives

To evaluate the effect of Antiretroviral therapy on CD 4 cell count & WHO staging among people living with HIV/AIDS accessing services at tertiary care hospital in Karwar, coastal Karnataka.

Methodology

Retrospective cross-sectional descriptive study was conducted using data available from Antiretroviral Therapy Centre attached to Teaching Hospital of Karwar Institute of Medical Sciences, Karwar where Antiretroviral therapy is provided free of cost under National AIDS Control Organization.

Study population:

People Living with HIV/AIDS, who were accessing services at ART Centre attached to Teaching Hospital of Karwar Institute of Medical Sciences, Karwar and who were on first line Antiretroviral Therapy for at least past 6 months were included in the study.

Sample size and data collection:

This study was carried out as a part of study which aimed at assessing the level of adherence to Antiretroviral therapy and its determinants among People Living With HIV/AIDS utilising services of Anti retroviral Therapy Centre attached to Teaching Hospital of Karwar Institute of Medical Sciences, Karwar. Hence the sample size calculation was derived accordingly.

The sample size was calculated based on expected proportion of adherence to ART among PLHIV based on previous studies[8] using the formula $n = 4pq/d^2$ with a relative precision of 15%. Accordingly, a sample size of 110 was derived.

The data of those who were interviewed was collected. Data related to the CD4 cell count and WHO staging of disease before starting ART and at the time of study was collected from the patient records maintained at ART centre.

Statistical analysis:

Data collected was entered into excel sheet and analyzed using SPSS version 16 statistical software. Frequency, percentage and means were used to present the data. Relevant data was analysed by calculating standard error of mean, standard deviation, paired t tests& Chi square test. For all the tests, p-value of < 0.05 was considered for statistical significance. Binary Logistic Regression was applied to know the association.

Ethical clearance:

Ethical clearance was obtained from Institutional Ethical Committee of Karwar Institute of Medical Sciences, Karwar.

Results

In the present study, 110 PLHIV on ART were included. Among them 54.5% were males & 45.5% were females. More than half of the participants i.e. 54.5% of them were in the age group of 40-59 years. Table 1 Shows that before starting ART, 80% of the participants had CD4 cell count below 500 cells/cmm and only 20% had CD4 cell count above 500 cells/cmm, whereas at the time of study, it was observed that only 33.6% were having CD4 cell count below 500 cells/cmm and 66.4% had CD4 cell count above 500 cells/cmm. After the start of ART, there was significant decrease in number of patients with CD4 cell count below 200 and between 200-350. Also, there was significant increase in number of patients with CD4 cell count between 350-500and above 500.

In this study when CD 4 cell count before starting ART & at the time of study were compared, it was observed that the mean CD4 cell count before starting

ART was 311.92± 257.24. At the time of study, the mean value of CD4 count increased to 672.82 ± 357.28. It was observed that the mean increase in CD4 cell count was 360.6 and this difference between the mean CD4 cell count was statistically significant (P < 0.01). (Table 2)

In our study when change in CD4 cell count after starting ART was compared with duration on ART, it was observed that mean decrease in CD4 cell count was 172 Cells/cmm with SD 140 Cells/cmm and mean increase in CD4 cell count was 451 Cells/cmm with SD 324 Cells/cmm. Significant association was observed between duration on ART & change in CD4 cell count of PLHIV after starting ART.

Binary logistic regression analysis of change in CD4 cell count after starting ART with different variables like age group, gender, adherence (three months), duration on ART and WHO Stage at the time of study, it was found that PLHIV who were on ART for more than 5years had 11.242 times more chances (Adjusted OR= 11.24 with p=0.001) of increase in CD4 cell count as compared to those who were on ART for less than 5years. (Table 3)

Table 4 Shows that, before starting ART 30.9%, 25.5%, 31.8% & 11.8% of the PLHIV were in the WHO stage I, II, III and IV respectively, while at the time of study 99.1% were in the WHO stage I, while 0.9% were in WHO stage II. None of them were in WHO stage III and IV at the time of study. It was observed that, significant number of PLHIV who were in WHO stage II, III & IV before starting ART were now in WHO stage I due to effect of ART.

Table 1: CD 4 cell count before starting ART & at the time of study

CD4 Cells/cmm	Before starting ART	At the time of study	Z-test for difference in Proportions (p-value)
	n(%)	n(%)	
< 200	41 (37.3)	6 (5.4)	-5.76 (p < 0.00001*)
200-350	38 (34.5)	11 (10.0)	-4.38 (p<0.00001*)
350-500	9 (8.2)	20 (18.2)	2.19 (p=0.029*)
> 500	22 (20.0)	73 (66.4)	6.94 (p < 0.00001*)

* Significant Difference

Table 2: Comparison of CD 4 cell count before starting ART & at the time of study

CD 4 cell count(Cells/ cmm)	Mean	N	Std. Deviation	Std. Error Mean	t	p
Before starting ART	311.92	110	257.24	24.53	-10.115	<0.001*
At the time of study	672.86	110	357.28	33.07		

* Statistically significant

Table 3: Binary Logistic Regression Analysis

Variable		Change in CD4 count after the start of ART		Crude OR (95% CI)	p-value	Adjusted OR (95% CI)	p-value
		Decrease (19) n(%)	Increase (91) n(%) Ref				
Age group (Years)	18-20	0 (0)	1 (1.1)	1		1	
	21-40	6 (31.6)	20 (21.9)	-	-	-	1.000
	41-60	11 (57.9)	63 (69.3)	-	-	-	1.000
	>60	2 (10.5)	7 (7.7)	-	-	-	1.000

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Variable		Change in CD4 count after the start of ART		Crude OR (95% CI)	p-value	Adjusted OR (95% CI)	p-value
		Decrease (19) n(%)	Increase (91) n(%) Ref				
Gender	Female	10 (52.6)	40 (44.0)	1		1	
	Male	9 (47.4)	51 (56.0)	1.42 (0.53 – 3.82)	0.49	1.634 (0.46 – 5.78)	0.446
Adherence	≤ 95%	4 (21.1)	8 (8.8)	1		1	
	>95%	15 (78.9)	83 (91.2)	2.77 (0.74-10.36)	0.13	1.343 (0.21-8.56)	0.755
ART duration	≤ 5 Yrs	15 (78.9)	28 (30.8)	1		1	
	>5 Yrs	4 (21.1)	63 (69.2)	8.44 (2.57-27.72)	0.0004*	11.242 (2.73-46.22)	0.001*
WHO Stage at the time of study	Stage I	16 (84.2)	90 (98.9)	1		1	
	Stage II	1 (5.3)	0 (0)	0.06	0.09	-	1.000
Constant						$6.54*10^7$	1.000
*Significant							
Cox & Snell R^2= 0.172 Nagelkerke R^2= 0.295							
Omnibus tests of model coefficients was significant with p = 0.01 and According to Hosmer & Lemeshow test, the model was a good fit with P = 0.615							

Table 4: WHO staging before starting ART & at the time of study

WHO Staging	Before starting ART n(%)	At the time of study n(%)	Z-test for difference in Proportions (p-value)
Stage I	34 (30.9)	109 (99.1)	10.60 (p<0.0001*)
Stage II	28 (25.5)	1 (0.9)	-5.381 (p<0.0001*)
Stage III	35 (31.8)	0 (0)	-6.45 (p<0.0001*)
Stage IV	13 (11.8)	0 (0)	-3.72 (p=0.0002*)

*Significant Difference

Discussion

In India the guidelines on when to start ART have evolved over the years towards earlier initiation of ART;CD4 count cut-off point for ART initiation moving from less than 200 cells/cmm in 2004 to less than350 cells/cmm in 2010 and then to less than 500 cells/cmm in 2013. The current 2021 NACO guidelines recommendation is to treat all, regardless of the clinical stage or CD4 count.[1] This has a public health importance of advocating for prompt initiation of ART and management of opportunistic infections to save PLHIV from deteriorating further. In our study, among 110 patients who were on first line anti retroviral therapy for at least past 6 months that were observed, more than half of the participants i.e. 54.5% of them were in the age group of 40-59 years. Before starting ART only 20% had CD4 cell count above 500 cells/cmm whereas at the time of study 66.4% had CD4 cell count above 500 cells/cmm. It was observed that, the starting of ART among PLHIV was significantly associated with the increase in their CD4 cell count. In a study conducted by Asfaw A et al, similar observation of improvement in CD4 cell count among patients on ART was seen during

4 years period.[5] These findings are consistent with the retrospective longitudinal study conducted in eastern Ethiopia where the median CD4 lymphocyte count had improved over the five year period.[9] Similarly significant improvement in CD4 cell count was observed in study conducted by Kumar et al.[10]

In our study the mean increase in CD4 cell count among PLHIV on ART was observed to be 451 ± 324, and also it was statistically significant (P < 0.01). This shows that PLHIV are benefitted with ART. Similar observation of significant improvement in mean CD4 cell count was observed in study conducted by Kumar et al.[10]In a study conducted by Mocroft et al. have reported the greatest mean increase in CD4 count of 100 cells/cmm after the first year of ART.[11] CASCADE Collaboration have reported that the median CD4 cell count increase at 6 months on ART was 119 cells/cmm.[12]A study conducted by Otieno CF et al observed that, absolute mean CD4+ cell counts at initiation of HAART was 141.7 ± 176.5 cells /µl and it increased to 192.4 ± 198.5 cells/µl at three months. The mean CD4+ cell count at 12th month of therapy was 268.6 ± 189.9. [13]

We observed that, before starting ART 30.9%, 25.5%, 31.8% & 11.8% of the participants were in the stage I, II, III & IV of WHO staging respectively, while at the time of study 99.1% were in the WHO stage I, while 0.9% were in WHO stage II. None of them were in stage III & IV. This shows that here is improvement in the WHO staging of the disease after the start of Antiretroviral Therapy. Similarly, in a study conducted by Kumar A et al it was observed that before starting ART 2%, 29%, 68% & 1% of the participants were in the stage I, II, III & IV of WHO staging respectively, while at the time of study 61% were in the stage I, while 30% were in stage II and 9% were in stage III.[10]Binary Logistic Regression analysis shows that only the duration on ART (more than 5years) was significantly associated with increase in CD4 cell count. Kumar A et al in their have concluded that higher mean change in the CD 4 cell count and the change was significant association with duration on ART.[10] Similarly study by Sarna et al and Safren SA et al also showed similar kind of results where increase in CD 4 cell count associated with duration on ART.[14,15]

Conclusion

The starting of ART among PLHIV was significantly associated with the increase in their CD4 cell count. There was statistically significant improvement in the mean CD4 cell count among those on ART (more than 5years). There is an improvement in the WHO staging of the disease after the start of Anti Retroviral Therapy.

Limitation:

The present study was a record based study. Opportunistic infections influencing the CD4 cell count or WHO staging at the time of study were not considered during analysis.

Conflict of Interest: None declared

Ethical approval: The study was approved from Institutional Ethical Committee.

References

1. National AIDS Control Organization. Ministry of Health and Family Welfare. Government of India. New Delhi; National technical guidelines on Anti Retroviral Treatment. October 2018. P-03,34.

2. Mrudula N D, Suwarna U P, Khadse R K, Minal P, Shubhangi D K. Statistical Analysis and Evaluation of CD4 Count after 6 Months on ART. Indian J Community Med 2012;37:266-7DOI: 10.4103/0970-0218.103480

3. Danforth K, Granich R, Wiedeman D, et al. Global Mortality and Morbidity of HIV/AIDS. Major Infectious Diseases. 3rd edition. Washington (DC): The International Bank for Reconstruction and Development / The World Bank. 2017 Nov 3. Chapter 2. Available from: https://www.ncbi.nlm.nih.gov/books/NBK525184/ doi: 10.1596/978-1-4648-0524-0_ch2

Naveenkumar G Havale, Abhishek M Prayag, Manjula M Naik et. al. / Effect of Antiretroviral Therapy on
CD 4 cell count and WHO Staging among PLHIV Accessing Services at Tertiary care Hospital, Coastal Karnataka

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4. National AIDS Control Organisation, Ministry of Health and Family Welfare, Government of India, National Strategic Plan for HIV/AIDS and STI 2017 – 2024, December 1, 2017, P-16.

5. Asfaw A, Ali D, Eticha T, Alemayehu A, Alemayehu M, Kindeya F (2015) CD4 Cell Count Trends after Commencement of Antiretroviral Therapy among HIV-Infected Patients in Tigray, Northern Ethiopia: A Retrospective Cross-Sectional Study. PLoS ONE 10(3): e0122583. DOI:10.1371/journal.pone.0122583

6. Smith CJ, Sabin CA, Youle MS, Kinloch-de Loes S, Lampe FC, Madge S, Cropley I, Johnson MA, Phillips AN. Factors influencing increases in CD4 cell counts of HIV-positive persons receiving long-term highly active antiretroviral therapy. The Journal of infectious diseases. 2004 Nov 15;190(10):1860-8.

7. Shoko C, Chikobvu D, Bessong PO. Effects of Antiretroviral Therapy on CD4+ Cell Count, HIV Viral Load and Death in a South African Cohort: A Modelling Study. Pakistan Journal of Biological Sciences: PJBS. 2020 Mar 1;23(4):542-51.

8. Achappa B, Madi D, BhaskaranU,Ramapuram JT, Rao S, Mahalingam S. Adherence to antiretroviral therapy among people living with HIV. North Am J Med Sci 2013;5:220-3DOI: 10.4103/1947-2714.109196

9. Reda AA, Biadgilign S, Deribew A, Gebre B, Deribe K. Predictors of Change in CD4 Lymphocyte Count and Weight among HIV Infected Patients on Anti-Retroviral Treatment in Ethiopia: A Retrospective Longitudinal Study. PLoS ONE. 2013; 8(4): e58595. DOI: 10.1371/journal.pone.0058595 PMID: 23573191

10. Kumar A, Girish HO, Koppad R,Balu PS, Vijayakumar B. Level of adherence and cluster of differentiation 4 cells response: A study on patients living with HIV/AIDS at tertiary care hospital, Central Karnataka. Int J Med Pharm Sci 2014 Feb;4(6):11-18.

11. Mocroft A, Phillips AN, Gatell J, Ledergerber B, Fisher M, Clumeck N. Normalisation of CD4 counts in patients with HIV-1 infection and maximum virological suppression who are taking combination antiretroviral therapy: an observational cohort study. Lancet 2007 Aug 4;370(9585):407-13. DOI: 10.1016/S0140-6736(07)60948-9.

12. Babiker A, Darbyshire J, Pezzotti P, Porter K, Prins M, Sabin C, Walker AS; CASCADE Collaboration. Short-term CD4 cell response after highly active antiretroviral therapy initiated at different times from seroconversion in 1,500 seroconverters. J Acquir Immune Defic Syndr. 2003 Mar 1;32(3):303-10. doi: 10.1097/00126334-200303010-00010. PMID: 12626891.

13. Otieno CF, Otedo AE, Othero D, Otiende MY, Okoth P, Omonge EO, Oyoo GO. CD4+ Cell Response to Anti-Retroviral Therapy (ARTS) In Routine Clinical Care Over One Year Period in a Cohort of HAART Naive, HIV Positive Kenyan Patients. East African Medical Journal. 2013;90(12):S15-24.

14. Sarna A, Pujari S, Sengar AK, Garg R, Gupta I, Vandem J. Adherence to antiretroviral therapy & its determinants amongst HIV patients in India. Indian J Med Res 2008 Jan;127:28-36.PMID: 18316850

15. Safren SA, Kumarasamy N, James R, Raminani R, Solomon S, Mayer KH. ART adherence, demographic variables and CD4 outcome among HIV-positive patients on antiretroviral therapy in Chennai, India. AIDS Care 2005 Oct;17(7): 853 – 862.DOI: 10.1080/09540120500038439.

A Rare Case Study to Understand the Path of Post Dengue Mucormycosis

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Abstract

Mucormycosis is a rare form of opportunistic and third most common fungal infection which is aggressive in nature and frequently fatal. The infection is chronic, persisting for years, attributed by immunocompromised status of the patients with poor oral and nasal hygiene. A case study attempted to understand the path of Mucormycosis in a case of post dengue infection admitted at the tertiary care hospital. Interview with the case and caretaker and the case file review was done to collect the data. This is the case of rhino- orbital Mucormycosis attributed by uncontrolled blood sugar during treatment of dengue infection, the disease progression has been triggered by ignorance from the health care personnel's & the patient's unhygienic practices. Unsafe and infected environment of the hospital made her immunocompromised and vulnerable due to dengue and gave the chance of disease progression.

Keywords: Dengue, Mucormycosis, Uncontrolled Diabetes, Fever, Hospital, Immunocompromised

Introduction

Mucormycosis was discovered by German pathologist Paltauf In 1885[1] and the term Mucormycosis coined by R.D. Baker.[2] It is an insidious fungal infection caused by members of Mucorales and Zygomycotic Species. Infections with Mucorales are categorized by rapid progression. The major risk factors for Mucormycosis include uncontrolled diabetes mellitus, treatment with corticosteroids, organ or bone marrow transplantation, neutropenia, trauma, burns, malignant hematologic disorders and deferoxamine therapy in patients receiving haemodialysis.[3]

Dengue is an infectious disease caused by dengue virus serotypes: DENVs 1–4.[4] Infection with DENV results in varying degrees of pathological conditions, ranging from mild asymptomatic dengue fever (DF) to severe dengue haemorrhagic fever (DHF) and dengue shock syndrome (DSS) which may turn fatal. DF is a self limiting fever, lasting usually for 5–7 days.[5] Treatment is usually symptomatic. Due to the associated comorbidities and immunocompromised status, these patients are prone to develop severe opportunistic infections. Mucormycosis followed by dengue fever is the rarest form of opportunistic infection. Therefore, it is an attempt to understand

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the path of Mucormycosis in a case of post dengue infection admitted at the tertiary care hospital with the hope to add knowledge in this regard to the clinicians, epidemiologists and policy makers. That will be a road map for further research in future.

Case Description

A 42 year female with the history of three days fever reported to a trust hospital on 7th of october 2021 when she didn't relieve by paracetamol at home. Where she found positive for dengue NS1 and stayed there for seven days. The case has been treated symptomatically for dengue fever with paracetamol, salmeterol, cefoperazone & sulbactam, fluid supplementation, pantoprazole & platwell tablet. She is a known case of type 2 diabetes meliteus since 4 years but not on regular medication. She is asthmatic too since 8 years for which she was taking asthalin inhaler 1-2 times in a day during the episodes. On 13thoctober she reported ptosis on right eye, pain and swelling on right side of the face, difficulty in eye movements later diminution of vision of same eye, black purulent discharge from both nasal cavity & right-side jaw pain (figure1), but health care staff told her that this all was because of medication she was taking and discharged her on 16th of October. On 17th of October she visited to a private hospital where she was told to get admitted in medical college hospital in view of suspected mucormycosis. In medical college hospital she was found with raised blood sugar (11.3g/dl HB1AC and 278mg/dl RBS). Treatment started with liposomal amphotericin B 3.5 mg, i/v Posaconazole 300mg od, insulin 30 IU, inj piptaz 4.5 mg, clindamycin 400mg, inj tramadol 1 amp, inj metrogyl 400 mg, inj aciloc 1 amp. On 19thOctober, she went through Cone beam computed tomography (CBCT) of Maxilla &Mandible and found with b/l maxillary sinuses thickening and blockage by osteomeatal complexes, demineralization & thinning of the right maxillary sinus, mucosal thickening of b/l ethmoid, sphenoid and frontal sinuses, chronic pan sinusitis with generalized periodontitis. On 21st of October she got operated with right Caldwell-Luc (CWL) operation with endoscopic debridement under GA. On 29th October MRI Brain, Orbit & PNSwas done & found moderate mucosal thickening of b/l maxillary, ethmoid, sphenoid and frontal sinuses

with post-operative changes. Histopathology report of 25th October showed necrosis with mucormycosis. KOH mounting on 10th November revealed growth of aspergillus fumigatus. On the 20th November second endoscopic debridement under GA was done. Contrast enhanced MRI (CEMRI) of Brain with Orbit /PNS was done on 22nd November & found post-operative changes. Repeated KOH mounting of 23rd November showed absence of any fungal elements. During the treatment blood sugar was maintained within the limit by proper sugar monitoring & medication. After the successful treatment she was discharged on 8th of December.

Figure.1. Presentation of Mucormycosis in Case

Discussion

It was the case of post dengue Rhino-orbital Mucormycosis. Dengue causes fever and increases metabolic rate, which can lead to a rise in fluctuation in blood sugar levels, as it was found in our case study with the very high HB1AC & FBS during the time of admission and after the recovery of dengue. If it is not monitored properly, there is high risk of such patients developing serious complications. The pathogenesis of Mucor mycosis in dengue could be due to lowering down of platelet counts up to the 50,000 along with steroid therapy and immunocompromised status like diabetes, renal disease, hepatocardiac disorders make such patients vulnerable for Mucormycosis.

A similar case was also reported on 15th November in TOI at Delhi where 49-year male had sudden loss of vision in one eye after 15 days of recovery from dengue was confirmed case of mucormycosis.

Similarly, another case of post dengue Mucormycosis was reported on 29thOctober 2021 at Indore, India in a50 year old male who recovered from dengue and developed mucormycosis after 1 week.

It was stated by treating doctors that post dengue Mucormycosis is a rare combination. The common point was noticed that in our case and reported case from Indore, post dengue Mucormycosis occurred after 7 days while the case at Delhi it was after 15 days. All of them were in a middle age group.

Another case study of Telangana, India was reported *by* Afroze SN, Korlepara R, Rao GV, Madala J about where the case who was 50 year female with uncontrolled diabetes and asthma along with complaints of pain and swelling on her right side of the face which was confirmed as a case of mucormycosis by a paranasal sinus view (PNS) radiograph, computed tomography (CT) and microscopic examination under haematoxylin& eosin stain.[6]

We've also observed during the 2nd wave of covid-19 pandemic at Jabalpur and neighbouring districts where more than 200 cases were reported with post covid Mucormycosis with most prevalent history of uncontrolled diabetes, steroid and oxygen therapy.[7]

Another unique case reported by Sabobeh T, Mushtaq K, Elsotouhy A, Ammar AA, Rashid S.at Doha, Qatar where Mucormycosis occurred along with hepatitis C, liver cirrhosis and diabetes. [8]

The evidences related with post dengue Mucormycosis with immunocompromised status of the cases clearly demonstrate that individuals who lack phagocytes or have impaired phagocytic function are at higher risk of Mucormycosis. Diabetes mellitus tends to change the normal immunological response of body to any infection in several ways. Hyperglycaemia stimulates fungal proliferation and also causes decrease in chemotaxis and phagocytic efficiency which permits the opportunistic organisms to thrive in acid-rich environment.

In the present case uncontrolled diabetes has been weakened her immunity which was attributed by dengue. Her weak immunity gave the favourable chance to disease to get develop. Her hospital stay was failed to provide her safe and spore free environment & clear the way of Mucormycosis and also negligence towards symptoms reported by the case.

Therefore, the need of more research in view of dengue complications including Mucormycosis and to rule out infection as early as possible to avoid further complications.

Conclusion

This post dengue rhino- orbital Mucormycosis case was attributed by uncontrolled blood sugar during treatment of dengue infection, ignorance from the health care personnel along with patient's unhygienic practices. Late diagnosis lead disease progression with worsening of symptoms**.** It's advisable not to ignore warning signals reported by the patients in order to save their lives and co-morbidities. The early diagnosis, prompt care and required treatment with essential surgical intervention and proper monitoring and management of blood sugar are some imperative steps for the successful & speedy recovery of the patient.

References

1. Kwon-Chung KJ. Taxonomy of fungi causing mucormycosis and entomophthoramycosis (zygomycosis) and nomenclature of the disease: molecular mycologic perspectives. Clin Infect Dis. 2012 Feb;54 Suppl 1(Suppl 1): S8-S15. [cited 2022 Jan 18], doi: 10.1093/cid/cir864. PMID: 22247451; PMCID: PMC3276235.

2. Ramalingam Suganya, Narasimhan Malathi, Vinithra Karthikeyan and Vyshnavi Devi Janagaraj, Mucormycosis: A Brief Review, J Pure Appl Microbiol., 2019; 13(1):161-165[cited 2022 Jan 18], doi: 10.22207/ JPAM.13.1.16

3. Prakash H, Chakrabarti A. Global Epidemiology of Mucormycosis. J Fungi (Basel). 2019 Mar 21;5(1):26. [cited 2022 Jan 21], doi: 10.3390/jof5010026. PMID: 30901907; PMCID: PMC6462913

Neelam Anupama Toppo, Aditya Thakur, Sapna Tiwari / A Rare Case
Study to Understand the Path of Post Dengue Mucormycosis

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4. Raksakoon C, Potiwat R. Current Arboviral Threats and Their Potential Vectors in Thailand. Pathogens. 2021 Jan 18;10(1):80[cited 2022 Jan 21] .doi: 10.3390/pathogens10010080. PMID: 33477699; PMCID: PMC7831943

5. Gubler DJ. Dengue and dengue haemorrhagic fever. Clin Microbiol Rev. 1998 Jul;11(3):480-96. [cited 2022 Jan 18], doi: 10.1128/CMR.11.3.480. PMID: 9665979; PMCID: PMC88892.

6. Afroze SN, Korlepara R, Rao GV, Madala J. Mucormycosis in a Diabetic Patient: A Case Report with an Insight into Its Pathophysiology. Contemp Clin Dent. 2017 Oct-Dec;8(4):662-666. [cited 2022 Jan 18], doi: 10.4103/ccd.ccd_558_17. PMID: 29326525; PMCID: PMC5754995

7. Toppo NA, Thakur A, Soni D, Dubey P, Tiwari S. An illustration of delays in Mucormycosis: A case Study. Indian J Community Health [Internet]. 2021 Sep. 30 [cited 2022 Jan. 21];33(3):515-8. Available from: https://www.iapsmupuk.org/journal/index.php/IJCH/article/view/2190

8. Sabobeh T, Mushtaq K, Elsotouhy A, Ammar AA, Rashid S. Invasive rhino cerebral mucormycosis in a patient with liver cirrhosis leading to fatal massive stroke. Med Mycol Case Rep. 2018 Sep 21; 22:69-73. [cited 2022 Jan 18], doi: 10.1016/j.mmcr.2018.09.006. PMID: 30294535; PMCID: PMC6169250.

Low Back Pain and Physical Activity during Pregnancy: A Longitudinal Prospective Study

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Abstract

Background: Low back pain (LBP) is an increasingly reported condition, and physical activity (PA) may play an important role. The aim of the present study was to evaluate the proportion of pregnancy-related LBP and its association with type and intensity level of PA during pregnancy.

Methods: A longitudinal prospective study was carried out with a cohort of 118 pregnant women. Participants were evaluated in all trimesters. LBP was assessed with a self-reported questionnaire and participants were categorized according to its occurrence. The type and intensity of PA were evaluated using the *Pregnancy Physical Activity Questionnaire* and categorized into tertiles. Binary logistic regression models were constructed to verify the relationship between LBP and type, the intensity of PA in all trimesters, and LPB pre-pregnancy.

Results: LBP was reported by 40.7%, 52.2% and 66.7% of the subjects in the first, second, and third trimesters, respectively. No significant associations were found between LBP and type and intensity of PA. However ,women who had LBP before pregnancy, compared to those who did not, had higher odds of expressing LBP during pregnancy (OR= 3.85, 95% CI: 1.344-11.025).

Conclusions: LBP is a common condition and increased during pregnancy. Results of this study suggest that type and intensity of PA are not associated with emerging of LBP during pregnancy.

Key-Word: Pregnancy; Low back pain; Physical activity; PPAQ

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Background

Low back pain (LBP) it's a very common condition and frequently affects women during pregnancy and has a great impact on their daily lives [1,2], in terms of quality of life, public health costs and productivity [2,3]. According to several studies, the development of LBP during pregnancy is related to low physical activity (PA) levels of pregnant women [4-6]. PA and exercise provide physiological benefits for pregnant women, without compromising fetal growth or adversely impacting pregnancy, labor and delivery [7-9]. PA is of the utmost importance to life-long health and PA levels tend to decrease during pregnancy, community health promoters should evaluate whether lack of PA during pregnancy somehow influences the presence of pregnancy-related LBP, so that appropriate strategies for prevention and treatment can be established [10,11]. The evidence for the facts described is scarce, thus, the present study aimed to assess the prevalence of LBP and its association with type and intensity of PA during pregnancy.

Subjects and Methods

Study Design

A longitudinal prospective study was carried out at 11 health care centers in Portugal throughout September 2009 to November 2011. Women were invited to participate in the study during their first trimesters and were reassessed during their second and third trimesters.

The inclusion criteria used in this study were: women with confirmed pregnancies and less than 15 weeks of gestation (WG) for the first trimester, women with 15 to 28 WG for the second trimester and women with more than 28 WG for the third.

Women were considered ineligible if they had any of the following characteristics: diabetes, hypertension, heart disease or chronic disease; multiple gestation; age less than 18 or over 40 years; lack of competence in the Portuguese language or cognitive inability to answer a questionnaire [12].

One hundred eight-five women were eligible for inclusion in the present sample (Figure 1). Thirty-seven women were excluded. Thirty (20.3%) were dropped during the follow-up period for not completing questionnaires correctly. The net sample consisted of 118 pregnant women.
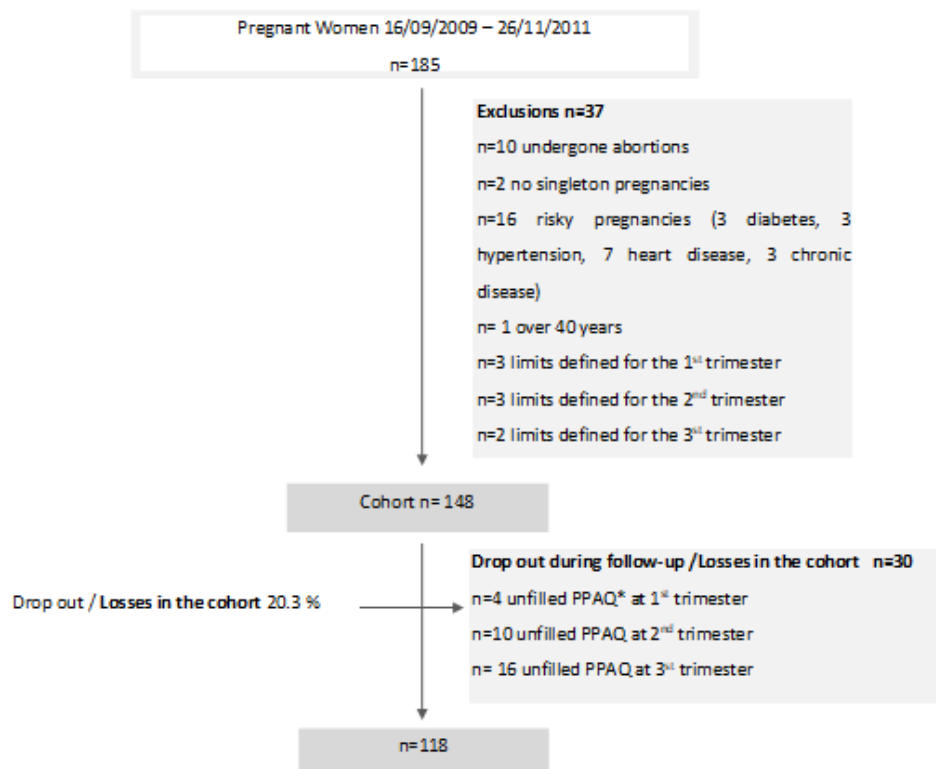
Figure 1: Chart of exclusions and losses in the cohort

There were no significant differences between the net sample and losses, the two groups had similar baseline characteristics.

Assessment Instruments

Data were collected during each trimester of pregnancy by trained nurses who administered structured and self-reported questionnaires.

Pre-pregnancy BMI was estimated from self-reported pre-pregnancy weight and height, using the formula: *BMI=weight(kg)/height^2(m^2).* Pre-pregnancy BMI was categorized according to Institute of Medicine [13] guidelines: *underweight*, *normal weight*, *overweight* and *obese*.

LBP was assessed using closed-ended questions that had been included in previously reported questionnaires. A woman was considered to have point LBP if she gave a positive answer to the specific question, *Have you ever felt LBP (pain in the lower back) during this gestational trimester?* If women answered this question affirmatively, they were asked to report the gestational week in which the pain began. A woman was considered to have period LBP if she gave a positive answer to the previously mentioned question in at least one of the three trimesters of pregnancy. A woman was considered to have pre-pregnancy LBP if she affirmatively answered the question, *Have you ever felt LBP (pain in the lower back) before becoming pregnant?*

Physical Activity (PA) Measurement

PA levels were determined using the Pregnancy Physical Activity Questionnaire (PPAQ)[12], a self-reported questionnaire that evaluates the type, duration and frequency of PA performed by pregnant women. Each activity was classified according to intensity – sedentary (<1.5 METs), light (1.5-3.0 METs), moderate (3.1-6.0 METs) or vigorous (>6.0 METs), and according to type – household/caregiving, occupational and sports/exercise.

Procedures

Eleven local health centers agreed to participate. The assessment instruments were individually administered during maternal health consultations that were held in each pregnancy trimesters.

Ethics

Ethical approval for the present study was obtained from the relevant institutional ethics committees.

Statistics

Descriptive data are presented as means and standard deviations. Associations between variables were analyzed via statistical inference. Yates continuity correction was used for analysis of 2x2 contingence tables. Binary logistic regression models were constructed to verify the relationship between LBP and type, intensity of PA in all trimesters and LBP pre-pregnancy. Statistical significance was defined as a *P*-value <0.05. Statistical analysis was conducted using PASW statistic v. 18 (SPSS, Chicago, Illinois, USA).

Results

The baseline characteristics of the sample are shown in Table 1. The final sample included 118 pregnant women, with a mean age of 28.8±4.85 years. About half of women had only primary education; 78.0% were employed full time. Half of women were primigest, and 34.2% were overweight/obese prior to becoming pregnant. There were no significant differences between women with and without LBP when it came to age, educational level, marital and professional status, monthly income, pre-pregnancy BMI and number of gestations (p>0.05 for all). Groups were only statistically different in terms of pre-pregnancy LBP (79.2% vs. 28.8%, p<0.001).

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Table 1: Descriptive Characteristic of Sample at Baseline

	n	Total	LBP		P value[1]
			Yes(n=48)	no (n=70)	
Age (years)	118				
[18, 30]		76(64.4)	34(70.8)	42(60.0)	0.312
[31, 40]		42(35.6)	14(29.2)	28(40.0)	
Educational level	118				
Mandatory or Less		58(49.2)	22(45.8)	36(51.4)	
Secondary		44(37.3)	19(39.6)	25(35.7)	0.836
College/University		16(13.6)	7(14.6)	9(12.9)	
Marital status	118				
Married/ Cohabitate		102(86.4)	41(85.4)	61(87.1)	0.788
Single/ Divorced		16(13.6)	7(14.6)	9(12.9)	
Professional status	118				
Employed /Student		92(78.0)	39(81.3)	53(75.7)	0.476
Unemployed		26(22.0)	9(18.8)	17(24.3)	
Monthly Income (€)	102				
<500		29(28.4)	11(26.2)	18(30.0)	
[500 -1250[		47(46.1)	22(52.4)	25(41.7)	0.548
≥1250		26(26)	9(21.4)	17(28.3)	
Pre-pregnancy BMI	117				
Underweight		4(3.4)	-	4(5.8)	
Normal Weight		73(62.4)	29(60.4)	44(63.8)	0.424*
Overweight/ Obese		40(34.2)	19(39.6)	21(30.4)	
Pregnancy weight gain**	116				
undergainer		30(25.9)	13(27.7)	17(24.6)	
Appropriate gain		42(36.2)	14(29.8)	28(40.6)	0.486
Over gain		44(37.9)	20(42.6)	24(34.8)	
Number of gestations	118				
Primigest		59(50.0)	24(50.0)	35(50.0)	1.000
Multigest		59(50.0)	24(50.0)	35(50.0)	
Pre-pregancy low back pain	118				
Yes		46(39.0)	38(79.2)	8(11.4)	<0.001
No		72(61.0)	10(20.8)	62(88.6)	

Results expressed as number (%); LBP– low back pain; BMI – Body Mass Index.

[1]Comparison between subjects with and without low back pain, using χ^2 test.

*p value refers only to Normal Weight and Overweight/ Obese **measure at the end of study

Pregnancy-related Low Back Pain Prevalence

Pre-pregnancy LPB was reported by 39.0% of women. There was a progressive increase in the frequency of LBP during pregnancy: 40.7%, 52.2% and 66.7% in the first, second and third trimesters, respectively (Figure 1). The period prevalence of LBP was 76.3%.
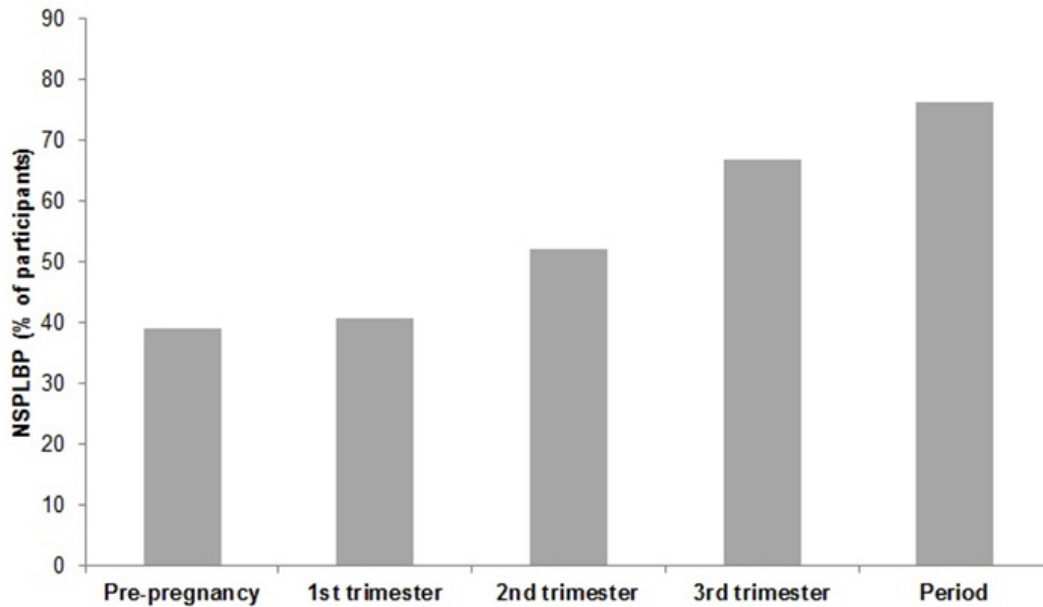
Figure 1: Prevalence of low back pain before and during pregnancy

(Pre-pregnancy: n=118; 1st trimester: n=118; 2nd trimester: n=115; 3rd trimester: n=117)

As regards the incidence of LBP, there were 10, 28 and 24 new cases in the first, second and third trimesters, respectively. Concerning the time during pregnancy at which symptoms of LBP began in new cases, a mean of 5.9±4.73 WG was found in the first trimester, 18.0±6.15 WG in the second trimester and 28±5.32 WG in the third trimester. However, first appearance of pain symptoms was reported throughout pregnancy, from the gestational age of 1 week until 37 WG.

Pregnancy-related Low Back Pain and Physical Activity

It was found that type and intensity of PA were not associated with LBP, except when it came to *household/caregiving* activities, where there were statistically significant differences between tertiles: during their second trimesters, women who were in the third tertile had a less LBP than women in the other tertiles (tertile 1 – 40.0%; tertile 2 – 38.3%; tertile 3 – 21.7%, p= 0,042- data not show).

We found no correlation between LBP and type and intensity of PA, however women who had LBP before pregnancy, compared to those who did not, had higher odds of expressing LBP during pregnancy (OR= 3.85, 95% CI: 1.344-11.025- data do not show).

Discussion

Several studies have attempted to understand the extent to which LBP affects pregnant women and impacts public health [14–16]. The present study found the period prevalence of LBP to be 76.3%. However, pre-pregnancy LBP seemed to be a significant risk factor for the development of LBP, possibly increasing LBP prevalence. The musculoskeletal changes found in women with pre-pregnancy LBP may thus be exacerbated during pregnancy, due to associated physiological changes [10,15,17].

Recently, Omoke et al, (2021) reported prevalence values that were lower than those found in the present study – 28.9% n=138 [18]. Nevertheless, the women were interviewed, during admission to the ward, 2 to 7 days after delivery, which can lead to memory bias. On the other hand, Mogren (2005) found the prevalence of lumbopelvic pain to be 71.7% (n=639), a value closer to the one found in the present study for period LBP [19].

The onset of symptoms may occur throughout pregnancy – at 1 WG at the earliest, and at 39 WG at the latest [19], however, are more frequent in third gestational trimester [20,21], this findings mirrors those of the present study. Although pregnancy-related LBP seems to develop during any trimester of

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pregnancy, the factors underlying it may vary. The biomechanical changes that occur during pregnancy appear to be the main explanation [22] – mainly the anterior displacement of a woman's center of mass [7,23], which increases the momentum of forces applied to the lumbar spine [24]. Furthermore, abdominal muscles stretch to accommodate the expanding uterus, and thus their ability to perform their postural functions gradually decreases [24]. However, a considerable portion of women first experienced LBP during their first trimesters, when biomechanical changes are not yet significant [24]. This suggests that, in some cases, pain may also be related to hormonal changes –increase of the hormone relaxin, which causes the relaxation of connective tissue, leading to greater ligamental laxity [7,23], particularly in the lumbopelvic join [14,22].

A downward trend in PA levels during pregnancy was observed, as reflected by PPAQ total activity scores. However, PPAQ scores by intensity and type showed that the values found with the present Portuguese sample were higher than those found with other samples in other studies (e.g. in the US, [12], Vietnam [25] and Brazil [26]). This could be due to cultural differences in the samples.

LBP frequency was not proven to be associated with either type or intensity of PA levels during pregnancy. An association was only found between this condition and *household/caregiving*. Some authors have studied the possible influence of organized PA practice during pregnancy on the development of LBP, but their conclusions have not been in agreement [22]. Recently, randomized studies [27-29], were carried out to assess the effectiveness of a specific exercise program on the prevention or reduction of LBP, and found that it was beneficial[27-29]. Furthermore, other study concluded in a follow-up study (n=891) that a greater number of years of leisure PA before pregnancy decreased the risk of developing lumbopelvic pain during this period. The author suggested that women's pre-pregnancy physical conditions may be a stronger predictor of the development of LBP during pregnancy [19]. Moreover, it should be noted that most of the women in the present study reported having LBP before pregnancy, which means that they could

have already had muscle imbalances that worsened during pregnancy.

These results suggest that PA itself may lead to health gains in those with specific conditions, such as diabetes and hypertension, overweight/ obesity but may not be enough for those with neuromusculoskeletal conditions, such as LBP. Indeed, pregnant women may need to perform more focused and specific exercises (muscles responsible for lumbopelvic stability). Health care providers will play key roles in monitoring pregnant women while providing holistic and personalized approaches.

This study's main limitation is its subjective assessment of PA. Although the PPAQ is a specific, self-administered way to assess PA among pregnant women, and despite its good psychometric characteristics, it is only able to measure pregnant women's perceptions of PA. However, the community context in which the study was carried out made it difficult to use objective instruments.

Thus, future studies should be carried out with larger samples, so that more assertive conclusions can be drawn about the influence of PA during pregnancy on gestational LBP.

Conclusion

LBP is a common condition among pregnant women and should thus be considered a major public health issue. The present study suggests that women who had LBP before pregnancy, compared to those who did not, had higher odds of expressing LBP during pregnancy. This condition is not associated with type and intensity of physical activity during pregnancy, except when it comes to *household/ caregiving* activities during a specific period.

Conflicts of interest: No conflict of interest was reported by the authors of this paper.

References

1. Koukoulithras I, Stamouli A, Kolokotsios S, Plexousakis M, Mavrogiannopoulou C. The Effectiveness of Non-Pharmaceutical Interventions Upon Pregnancy-Related Low Back Pain: A Systematic Review and Meta-Analysis. *Cureus*. 2021;13(1):1-11. doi:10.7759/cureus.13011

2. Hu X, Ma M, Zhao X, et al. Effects of exercise therapy for pregnancy-related low back pain and pelvic pain: A protocol for systematic review and meta-analysis. *Med (United States)*. 2020;99(3):1-7. doi:10.1097/MD.0000000000017318

3. Oliveira CB, Maher CG, Pinto RZ, et al. Clinical practice guidelines for the management of non-specific low back pain in primary care: an updated overview. *Eur Spine J*. 2018;27(11):2791-2803. doi:10.1007/s00586-018-5673-2

4. Sehmbi H, D'Souza R, Bhatia A. Low Back Pain in Pregnancy: Investigations, Management, and Role of Neuraxial Analgesia and Anaesthesia: A Systematic Review. *Gynecol Obstet Invest*. 2017;82(5):417-436. doi:10.1159/000471764

5. Meander L, Lindqvist M, Mogren I, Sandlund J, West CE, Domellöf M. Physical activity and sedentary time during pregnancy and associations with maternal and fetal health outcomes: an epidemiological study. *BMC Pregnancy Childbirth*. 2021;21(1):1-11. doi:10.1186/s12884-021-03627-6

6. Mottola MF, Davenport MH, Ruchat SM, et al. No. 367-2019 Canadian Guideline for Physical Activity throughout Pregnancy. *J Obstet Gynaecol Canada*. 2018;40(11):1528-1537. doi:10.1016/j.jogc.2018.07.001

7. ACOG. Committee Opinion number 804: Physical activity and exercise during pregnancy and Postpartum Period. *Obstet Gynecol*. 2020;135(4):178-188. doi:10.3109/21679169.2013.861509

8. Mourady D, Richa S, Karam R, et al. Associations between quality of life, physical activity, worry, depression and insomnia: A cross-sectional designed study in healthy pregnant women. *PLoS One*. 2017;12(5):1-15. doi:10.1371/journal.pone.0178181

9. Rhodes RE, Janssen I, Bredin SSD, Warburton DER, Bauman A. Physical activity: Health impact, prevalence, correlates and interventions. *Psychol Heal*. 2017;32(8):942-975. doi:10.1080/08870446.2017.1325486

10. Mogren IM. Physical activity and persistent low back pain and pelvic pain post partum. *BMC Public Health*. 2008;8:1-5. doi:10.1186/1471-2458-8-417

11. Schlüssel MM, De Souza EB, Reichenheim ME, Kac G. Physical activity during pregnancy and maternal-child health outcomes: A systematic literature review. *Cad Saude Publica*. 2008;24(SUPPL.4):531-544. doi:10.1590/s0102-311x2008001600006

12. Chasan-Taber L, Schmidt MD, Roberts DE, Hosmer D, Markenson G, Freedson PS. Development and validation of a pregnancy physical activity questionnaire. *Med Sci Sports Exerc*. 2004;36(10):1750-1760. doi:10.1249/01.MSS.0000142303.49306.0D

13. IOM. Institute of Medicine and National Research Council .Weight Gain During Pregnancy: Reexamining the Guidelines Committee to Reexamine IOM Pregnancy Weight Guidelines Food and Nutrition Board and Board on Children, Youth, and Families. *Natl Acad Press*. Published online 2009. http://www.nap.edu.

14. Gutke A, Boissonnault J, Brook G, Stuge B. The Severity and Impact of Pelvic Girdle Pain and Low-Back Pain in Pregnancy: A Multinational Study. *J Women's Heal*. 2018;27(4):510-517. doi:10.1089/jwh.2017.6342

15. Wiezer M, Hage-Fransen MAH, Otto A, et al. Risk factors for pelvic girdle pain postpartum and pregnancy related low back pain postpartum; a systematic review and meta-analysis. *Musculoskelet Sci Pract*. 2020;48(September 2019):102154. doi:10.1016/j.msksp.2020.102154

16. Mohseni-Bandpei MA, Fakhri M, Ahmad-Shirvani M, et al. Low back pain in 1,100 Iranian pregnant women: prevalence and risk factors. *Spine J*. 2009;9(10):795-801. doi:10.1016/j.spinee.2009.05.012

17. Wu WH, Meijer OG, Uegaki K, et al. Pregnancy-related pelvic girdle pain (PPP), I: Terminology, clinical presentation, and prevalence. *Eur Spine J*. 2004;13(7):575-589. doi:10.1007/s00586-003-0615-y

18. Omoke NI, Amaraegbulam PI, Umeora OUJ, Okafor LC. Prevalence and risk factors for low back pain during pregnancy among women in Abakaliki, Nigeria. *Pan Afr Med J*. 2021;39. doi:10.11604/pamj.2021.39.70.24367

19. Mogren IM. Previous physical activity decreases the risk of low back pain and pelvic pain during pregnancy. *Scand J Public Health*. 2005;33(2):146-150. doi:10.1080/14034940510005743

20. Sencan S, Ozcan-Eksi EE, Cuce I, Guzel S, Erdem B. Pregnancy-related low back pain in women in Turkey: Prevalence and risk factors. *Ann Phys Rehabil Med*. 2018;61(1):33-37. doi:10.1016/j.rehab.2017.09.005

Paula Clara Ribeiro Santos, Diana Filipa Salvador Bernardo, Carla Marisa Maia Moreira et al. /Low Back Pain and Physical Activity during Pregnancy: A Longitudinal Prospective Study

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21. Kristiansson P, Svardsudd K, Von Schoultz B. Serum relaxin, symphyseal pain, and back pain during pregnancy. *Am J Obstet Gynecol*. 1996;175(5):1342-1347. doi:10.1016/S0002-9378(96)70052-2

22. Vermani E, Mittal R, Weeks A. Pelvic girdle pain and low back pain in pregnancy: A review. *Pain Pract*. 2010;10(1):60-71. doi:10.1111/j.1533-2500.2009.00327.x

23. Garshasbi A, Faghih Zadeh S. The effect of exercise on the intensity of low back pain in pregnant women. *Int J Gynecol Obstet*. 2005;88(3):271-275. doi:10.1016/j.ijgo.2004.12.001

24. Conder R, Zamani R, Akrami M. The biomechanics of pregnancy: A systematic review. *J Funct Morphol Kinesiol*. 2019;4(4). doi:10.3390/jfmk4040072

25. Ota E, Haruna M, Yanai H, et al. Reliability and validity of the Vietnamese version of the pregnancy physical activity questionnaire (PPAQ). *Southeast Asian J Trop Med Public Health*. 2008;39(3):562-570.

26. Takito MY, Neri LDCL, Helena M, Benício D. Evaluation of the reproducibility and validity of a physical activity questionnaire for pregnant women. *Rev bras med esporte*. 2008;14(2):132-138. doi:10.1590/S1517-86922008000200010

27. Kokic IS, Ivanisevic M, Uremovic M, Kokic T, Pisot R, Simunic B. Effect of therapeutic exercises on pregnancy-related low back pain and pelvic girdle pain: Secondary analysis of a randomized controlled trial. *J Rehabil Med*. 2017;49(3):251-257. doi:10.2340/16501977-2196

28. Backhausen MG, Tabor A, Albert H, Rosthøj S, Damm P, Hegaard HK. The effects of an unsupervised water exercise program on low back pain and sick leave among healthy pregnant women – A randomised controlled trial. *PLoS One*. 2017;12(9):1-16. doi:10.1371/journal.pone.0182114

29. Sonmezer E, Özköslü MA, Yosmaoğlu HB. The effects of clinical pilates exercises on functional disability, pain, quality of life and lumbopelvic stabilization in pregnant women with low back pain: A randomized controlled study. *J Back Musculoskelet Rehabil*. 2021;34(1):69-76. doi:10.3233/BMR-191810

Life-Satisfaction among Female Employees (A Study in Aligarh)

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Abstract

Occupational mental health is responsible for affecting the quality of personal life lead by the employees. Depression and anxiety are the most common psychosocial crisis that the female employees undergo both at home and at the workplace. Recent studies have proved that married woman with young children show more anxiety and depression. This study aimed at analyzing the level of life satisfaction among the female employees. A cross-sectional study was conducted from July 2019 to June 2020. Stratified random sampling was done in female employees in Jawaharlal Nehru Medical College, Aligarh Muslim University, Aligarh. A pre-tested semi-structured proforma was used. The study was being done on 378 participants . All the data were entered and analysed in SPSS-20.0 To find out the association between certain variables Chi-square/Fisher Test was used. It was found that Satisfaction with life is significantly associated with the occupation of the women.

Key words: life satisfaction, occupation, female employees

Introduction

The working women are found to face an increasing amount of physical and mental fatigue. Various research studies conducted suggest that women are vulnerable and prone to Psychosocial problems more than that of men. The mental health of women depends upon of factors pertaining to homes and workplaces. Ferree [7]and earlier studies by other authors have argued that women with jobs outside the home are generally happier and more satisfied with their lives than are full time housewives . Working women also reported better physical health than homemakers [8]. Besides the home-related factors and duties, job satisfaction is found to be an integral factor contributing to stress and strain in female employees. The factor of Life Satisfaction has also changed for women today. However, the theory of life satisfaction in psychology draws on the concept of examining the attitudes and feelings possessed by an individual towards life, thereby evaluating the quality of his life as a whole[1]. Mental state of an individual contributes to the shaping of quality of life and well-being of that individual [2]. Depression and anxiety are the most common psychosocial crisis that the female employees undergo while trying to give their best performance both at home and at the workplace. In most societies, work-life conflict seems to be quite high especially in case of working women. This is because in majority of societies worldwide, women

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have traditionally shouldered the bulk of family responsibilities and remain primarily responsible for their children and the care of the elderly [9]. Recent studies have proved that married woman with young children show more anxiety and depression. Most women studied stated that they would sacrifice their own free time and reduce the amount of sleep they had so that their children did not feel the adverse effects of having a working mother [10]. The findings of the recent studies, thus challenge the classical assumptions regarding workplaces as jungles of Psychosocial pressure and homes as 'sanctuaries of escape'[3].

This study aimed at analyzing the level of **Life-satisfaction among female employees**.

Materials and Methods

A cross-sectional study was conducted from July 2019 to June 2020. Stratified random sampling was done in female employees in Jawaharlal Nehru Medical College, Aligarh Muslim University, Aligarh. A pre-tested semi-structured proforma was used.

INCLUSION CRITERIA 1. Married female employees of JNMCH working for more than 1 year. 2. Female employees consenting for participation in the study.

EXCLUSION CRITERIA 1. Unmarried female employees. 2. Women with working duration of less than 1 year. 3. Not consenting for the participation

SAMPLE SIZE

Using a precision of 5% and 95% confidence interval the sample size was determined by the formula,

n = $Z^2 PQ/L^2$

Where, n = Sample Size

P = Prevalence of health problems taken

Q = (1-P)

L = Absolute error (5%)

Z = Value of the standard normal variable at 0.05 level of significance (1.96)

Due to non-availibility of larger scale research study on psychosocial problems among working women in this region, the prevalence of 32.9% from the study of[4] was considered for the purpose of calculation of sample size.

$$n = (1.96)^2 \times 0.329 \times (1- 0.329) / (0.05)^2 = 339 \approx 340$$

Considering a non-response rate of 10%, the final sample size came out to be:

N = 340 + (10% of 340) = 374 which was rounded off to 400.

Because of the Covid-19 pandemic, only 378 could be interviewed and considered further for study. So finally, the study was being done on 378 participants .

Six different categories of job were considered for the purpose of the study. Category 1 – Doctor / Medical Teacher

Category 2 – Nursing Officer

Category 3 – Lab Assistant / Technician / Medical Social Worker

Category 4 – Official / Clerical

Category 5 – Ward Assistant / Aya

Category 6 – MTS / Safaiwala

As per the different categories of the working female employees, the probability proportional to the size (PPS) was applied to get the appropriate sample size in proportion to the different categories of workers

TOOLS OF DATA COLLECTION

Data were collected using a pre-tested, semi-structured questionnaire. Study tools used were:

1 **The Satisfaction With Life Scale[18]** was developed to assess satisfaction with the respondent's life as a whole. The scale does not assess satisfaction with life domains such as health or finances but allows subjects to integrate and weight these domains in whatever way they choose.The SWLS is shown to be a valid and reliable measure of life satisfaction, suited for use with a wide range of age groups and applications. A 5-item scale designed to measure global cognitive judgments of one's life satisfaction (not a measure of either positive or negative affect).

1. In most ways my life is close to my ideal.
2. The conditions of my life are excellent.
3. I am satisfied with my life.
4. So far I have gotten the important things I want in life.
5. If I could live my life over, I would change almost nothing.

Participants indicate how much they agree or disagree with each of the 5 items using a 7-point scale. 7 - Strongly agree; 6 - Agree; 5 - Slightly agree ; 4 - Neither agree nor disagree ; 3 - Slightly disagree; 2 – Disagree; 1 - Strongly disagree.

Scoring: Cut off values used for the given scale is as mentioned in the table.

Final score	Inference
31-35	Extremely satisfied
26-30	Satisfied
21-25	Slightly satisfied

Final score	Inference
20	Neutral
15-19	Slightly dissatisfied
10-14	Dissatisfied
5-9	Extremely dissatisfied

2 For Socio economic class.[5] BG Prasad (1961) employed „per capita family monthly income as an indicator and classified the status into five classes. It is an income based scale and therefore, constant update is required to take inflation and depreciation of rupee into account.

All the data were entered and analysed in SPSS-20.0 To find out the association between certain variables Chi-square/Fisher Test was used.

Ethical approval was taken before the start of study from the Institutional Ethics Committee (IEC), Jawaharlal Nehru Medical College, AMU, Aligarh, UP, India.

Results

Fig 1: Satisfaction With Life Scale

Table 1: Satisfaction with life across different job categories

SWLS Responses	Occupation of woman (N=378)						Total
	Doctor	Nursing Officer	LA / Tech./ MSW	Official / Clerical	Ward Lady / WA / Peon	MTS / Safaiwala	
Extremely Dissatisfied	0	9 (4.27%)	0	0	14 (22.58%)	4 (11.43%)	27 (7.14%)
Dissatisfied	0	67 (31.75%)	11 (44%)	3 (20%)	4 (6.45%)	10 (28.57%)	95 (25.13%)
Slightly Dissatisfied	10 (33.3%)	54 (25.59%)	11 (44%)	3 (20%)	14 (22.58%)	6 (17.14%)	98 (25.93%)
Neutral	0	2 (0.95%)	0	4 (26.67%)	9 (14.52%)	0	15 (3.97%)
Slightly Satisfied	0	23 (10.90%)	2 (8%)	2 (13.33%)	9 (14.52%)	2 (5.71%)	38 (10.05%)
Satisfied	16 (53.33%)	47 (22.27%)	1 (4%)	3 (20%)	12 (19.35%)	13 (37.14%)	92 (24.34%)
Extremely Satisfied	4 (13.33%)	9 (4.27%)	0	0	0	0	13 (3.44%)
Total	30	211	25	15	62	35	378
❖ Satisfaction with life is significantly associated with the occupation of the women (χ2=140.384, df=30, p<0.001)							

Discussion

Age of the study participants ranged between 25 years to 59 years. The mean age of the study participants was 41.32 ± 9.411 years. Most of the study participants belonged to the age group of 31 to 40 years of age (n=127; 33.6%), followed by 41 to 50 years (n=107; 28.3%), 51 to 60 years (n=79; 20.9%) and 30 years or less (n=65; 17.2%) in decreasing frequency.

The large number of participants had **the professional diploma** (n=218; 57.7%), followed by high school (n=52; 13.8%) and professional degree (n=43; 11.4%). The main reason of high number of diploma holder may be because of the large number of nursing officers selected as study participants after probability proportional to size sampling method. Educational qualification is of great importance in different terms of life and career.

In this study, there were **Doctor/Teaching faculty** (n=30; 7.94%); LA/Technician/MSW (n=25; 6.61%); Nursing officer (n=211; 55.82%); Ward Assistant/ Peon (n=62; 16.40%); MTS/Safaiwala (n=35; 9.26%); Official/Clerical (n=15; 3.97%).

Among the total of 378 study participants, 261 (69%) were having **permanent job** while 117 (31%) participants were either on contractual or daily wages or fixed pay. Study done **by** [6]reveals that most of the regular healthcare staff were highly satisfied (86.9%) in comparison to the contractual staff (10.5%), which was moderately satisfied.

The mean duration of marriage among the study participants was found 16.46 ± 9.490 years.

Among all the 378 participants, 273(72.2%) belonged to the **nuclear family**, while 105(27.8%) reported to be living in a joint family. **Most of the**

husband of the participant were graduate (n=126; 33.3%) followed by high school (n=43; 11.4%) and professional qualification (n=35; 9.3%). Majority of the participants belonged to the Class I category (n=363; 96%) of the **Modified BG Prasad** Classification, while a very small portion belonged to the Class II category (n=15; 4%).

As in Fig 1,

Among all the 378 study participants, 25.93%(n=98) were slightly dissatisfied while 25.13% (n=95) were dissatisfied with life. Whereas, 7.14%(n=27) of the respondents were extremely dissatisfied with life. On summing up all the sub categories of dissatisfaction, it can be said that about 58% of the respondents were slightly to extremely dissatisfied with life. 3.97%(n=15) of the repondents were found of neutral life satisfaction. A very little portion of the participants (3.44%) were extremely satisfied while, 24.34% were satisfied with their life.

This finding is supported by a study [16] done to explore the satisfaction of health-care staff in Chinese public hospitals and to identify the factors affecting the satisfaction. The results revealed that in China, hospital staff members were mostly dissatisfied. Safety of operations, the security of the environment and management of the human resources were the highly reported reason for the lower satisfaction of the hospital members .

Another study[17] done among public health professionals of Islamabad, Pakistan revealed that staff in public sector health care organizations had a relatively low degree of overall satisfaction. The work climate, job description and time pressure were the key reasons for those who were not happy. Low employment, lack of educational opportunities, improper supervision and inadequate financial incentives were other factors affecting the degree of satisfaction.

As Shown in Table 2

Satisfaction with life is significantly associated with the occupation of the women ($\chi2=140.384$, df=30, **p<0.001**)

Doctors / Medical teachers with slight dissatisfaction with life were 33.3% (n=10).

Majority of the Doctors / Medical teachers (53.33%; n=16) were found to be satisfied with life while extremely satisfied were 13.33% (n=4).

Among the nursing officers, 4.27% (n=9) were extremely dissatisfied with life; 31.75% (n=67) dissatisfied; while 25.59% (n=54) were slightly dissatisfied with life. 10.9% (n=23) of the nursing officer were slightly satisfied; while 22.27% (n=47) satisfied and 4.27% (n=9) were extremely satisfied with life.

Among the LT/Technicians/MSW, 44% (n=11) were dissatisfied with life. While the same 44% (n=11) were slightly dissatisfied with life. Slight satisfaction was reported by 8% (n=2) while 4% (n=1) were satisfied with life.

Among the female employees working as officials/clerical, 20% (n=3) were dissatisfied with life; while respondents of the same proportion were slightly dissatisfied with life (20% ; n=3). Study participants with neutral satisfaction with life were 26.67% (n= 4). Slight satisfaction with life was reported by 13.33% (n=2); while 20% (n=3) reported for satisfaction with life.

Among the category of Ward lady/ Ward assistant/ Peon, extremely dissatisfied with life was reported by 22.58% (n=14); while 6.45%(n=4) reported dissatisfaction and 22.58% (n=14) reported slightly dissatisfied with life. Study participants with neutral satisfaction with life were 26.67% (n= 4). Slight satisfaction with life was reported by 14.52% (n=9); while 19.35% (n=12) reported for satisfaction with life.

Among the category of MTS/Safaiwala, extremely dissatisfied with life was reported by 11.43% (n=4); while 28.57% (n=10) reported dissatisfaction and 17.14% (n=6) reported slightly dissatisfied with life. Slight satisfaction with life was reported by 5.71% (n=2); while 37.14% (n=13) reported for satisfaction with life.

According to a study, regular health-care staff is more satisfied as compared to contractual staff [11].

According to a study[12], a long range of factors affecting employees' job satisfaction includes transparent approach of promotion system within

the organization, pay and benefit, the quality of the working condition to leadership and social relationships.

Adversely, a toxic workplace caused by low salary and wages, work relationships, job stress, inadequate opportunities will lead to women's dissatisfaction and discourage women to work with governmental organizations[13].

There are some job related factors which can ensure job satisfaction such as supervision, pay, promotion opportunities, coworkers and so forth, the nature of the work itself generally emerges as the most important job face[14,15].

Conclusion

Since women have to take care of home as well as her work place, it is highly recommended that good quality of cooperation, both at home and work place should be there. Efforts and policies are much needed at the level of community to abolish the gender biases. At home, family members need to understand the burden and stress of working women. The role of husband is very important in working females. This can be achieved by equal sharing of the responsibilities at home. Steps should be taken to ensure the women safety at work place and even during her travel to work place and back to home. There should be cab provision by the companies for travelling of employed females. There should be creches for females with small children. Breast feeding room provision should be there. Good mutual understanding and cooperation is all what is needed at the level of family and home.

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References

1. Huppert FA. Psychological well-being: Evidence regarding its causes and consequences. Applied psychology: health and well-being. 2009 Jul;1(2):137-64.

2. Jayachandran S. Social norms as a barrier to women's employment in developing countries. IMF Economic Review. 2021 Sep;69(3):576-95.

3. Seo D, Ahluwalia A, Potenza MN, Sinha R. Gender differences in neural correlates of stress-induced anxiety. Journal of neuroscience research. 2017 Jan 2;95(1-2):115-25.

4. Panigrahi A, Padhy AP, Panigrahi M. Mental health status among married working women residing in Bhubaneswar City, India: a psychosocial survey. BioMed research international. 2014 Jan 1;2014.

5. Pandey VK, Aggarwal P, Kakkar R. Modified BG prasad socio-economic classification, update-2019. Indian journal of community health. 2019 Jan 1;31(1).

6. Dixit J, Goel S, Sharma V. A comparative study on the level of satisfaction among regular and contractual health-care workers in a Northern city of India. Journal of Family Medicine and Primary Care. 2017 Apr;6(2):416.

7. Ferree MM. Working-class jobs: housework and paid work assources of satisfaction. Social problems. 1976 Apr 1;23(4):431-41.

8. Coleman LM, Antonucci TC. Impact of work on women at midlife. Developmental Psychology. 1983 Mar;19(2):290.

9. World Bank (2016),' Annual Report 2016,'. Available at: http://pubdocs. worldbank.org/en/596391540568499043/worldbankannualreport2016.pdf

10. Schieman S, Glavin P. Trouble at the border?: Gender, flexibility at work, and the work-home interface. Social Problems. 2008 Nov 1;55(4):590-611.

11. Dixit J, Goel S, Sharma V. A comparative study on the level of satisfaction among regular and contractual health-care workers in a Northern city of India. Journal of Family Medicine and Primary Care. 2017 Apr;6(2):416.

12. Rajan AP, John AM. Job satisfaction and its influence in the work environment.

13. Yusufzada S, Xia Z, Xia Z. Public administration in Afghanistan: challenges and way forward. Open Journal of Social Sciences. 2019 Jun 20;7(06):142.

14. Judge TA, Church AH. Job Satisfaction: Research and Practice. In Cooper, C. L. and Locke, EA (Eds.) Industrial and Organizational Psychology.

15. Jurgensen CE. Job preferences (What makes a job good or bad?). Journal of Applied psychology. 1978 Jun;63(3):267.

16. Cai S, Cai W, Deng L, Cai B, Yu M. Hospital organizational environment and staff satisfaction in China: A large-scale survey. International Journal of Nursing Practice. 2016 Dec;22(6):565-73.

17. Kumar R, Ahmed J, Shaikh BT, Hafeez R, Hafeez A. Job satisfaction among public health professionals working in public sector: a cross sectional study from Pakistan. Human resources for health. 2013 Dec;11(1):1-5.

18. Diener ED, Emmons RA, Larsen RJ, Griffin S. The satisfaction with life scale. Journal of personality assessment. 1985 Feb 1;49(1):71-5.

Menstrual Hygiene and Myths Associated with it among Adolescent Girls: A Quantitative Study in Coastal Karnataka

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Abstract

Introduction: India has largest adolescent population in world, every month 1.8 billion people across the world menstruate. The onset of menstruation means new phase and vulnerabilities in the lives of adolescents. Although menstruation is a natural process, it is linked with several perceptions and practices within the community, which sometimes may result in adverse health outcomes. SGD 6.2 acknowledges right to menstrual health and hygiene.

Objectives: To assess knowledge regarding menstrual hygiene and myths associated with it among adolescent girls.

Methodology: Community based cross sectional study among 298 adolescent girls. Information was collected using semi-structured and pre tested questionnaire. The data analyzed using Epi-info 7.2 and results interpreted in percentages and proportions.

Results: Mean age of menarche is 12.7 ± 1.7 years. 68.5% of study participants knew about menstruation before menarche. Mothers (41.6%) were source of information regarding knowledge about menstruation. 94.3% used sanitary napkin as absorbent. Girls had multiple restrictions.

Conclusion: Majority knowing about menstruation before menarche and understanding that it is a physiological process. Majority using sanitary napkins as absorbent emphasising the good menstrual hygiene practices. But sill myths associated with it like the age old practice of following certain restriction is observed.

Keywords: menstruation, hygiene, adolescent

Introduction

India has the largest adolescent population in the world and every fifth person is between 10 to 19 years. India stands to benefit socially, politically and economically if this large number of adolescents are safe, healthy, educated and equipped with information and life skills to support the country's continued development.[1] The onset of menstruation

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means a new phase and new vulnerabilities in the lives of adolescents. Yet, many adolescent girls face stigma, harassment and social exclusion during menstruation.[2] Although menstruation is a natural process, it is linked with several perceptions and practices within the community, which sometimes may result in adverse health outcomes.[3]

WHO and UNICEF Joint Monitoring Programme has defined menstrual hygiene as using clean menstrual management material to absorb or collect menstrual blood, that can be changed in privacy as often as necessary and having facilities to dispose it.[4] SGD 6.2 acknowledges the right to menstrual health and hygiene, with special attention to those in vulnerable situations by 2030.[5] Therefore, to understand the consequences and importance of menstrual hygiene practices among adolescent girls, it is important to study the current practices about the same so that future interventions can be planned accordingly.[6] Hence this study was conducted among adolescent girls on menstrual hygiene with regard to knowledge and myths associated with it.

Methodology

This is community based cross sectional study conducted among adolescent girls between 10 to 19 years who had attained menarche in the rural field practice area of KRIMS Karwar, Karnataka. Study period was from Nov 2019 to Jan 2020. Population covered by Angadi Primary Health Centre is 12700 (2019), in that adolescent girls population is 349. Universal sampling technique was followed where all adolescent girls who had attained menarche were included in study. Adolescent girls who had not attained menarche, severely ill, mentally disabled and refusal to participate were excluded. Thus the final study sample size was 298. After obtaining IEC clearance and before the interview, informed consent was obtained from the parent or guardian and ascent was taken from adolescent girls. Information on socio-demographic variables, knowledge, myths, beliefs and practices regarding menstruation was collected by door to door survey through semi-structured and pre tested questionnaire. Participants were given assurance that information collected would be confidential. After the interview girls were educated about menstrual health and hygiene. The data was cleaned, coded and analyzed using Epi-info 7.2 version software and results were interpreted in percentages and proportions.

Results

The total study participants were 298 of which 126 (42.3%) were in early adolescence (10-14 yrs) age and 172(57.7%) were in late adolescence (15-19 years) age. Mean age of study participants is 15.9 ± 1.9 years. Out of 298 study participants Hindus were 81.5% followed by Christians 17.4%. Education of mothers of study participants 43.3% were educated till secondary school, followed by primary school 10.4%, higher secondary 17.4%, degree or above 16.1% and 12.8% were illiterate. (Table:1).

Table:2 Study participants menstruation history shows 62.8% age of menarche 11-12 years followed by 13-14 years 30.5% and 15-16 years 5.4%. Mean age of menarche of study participants is 12.7 ± 1.7years. Among study participants 78.9% had regular and 21.1% had irregular menses.

Knowledge regarding menstruation showed that 68.5% knew about menstruation before menarche. When assessed about reaction at first menstruation, 42.3% had discomfort, 35.6% were scared, 14.1% were emotional and 8.1% were happy. It was observed that 72.5% knew that menstruation was a physiological process. Regarding source of information about knowledge on menstruation, 41.6% was from mothers, 32.9% from friends, 22.5% from sisters, 17.4% from teachers and 4% from Internet/online. (Table:3).

Menstrual hygiene practices shows that 94.3% used sanitary napkin as absorbent while 5.7% used cloth. Regarding frequency of change of absorbent, 73.2% changed every 3-6 hours followed by 15.4% every 6-9 hours. Method of disposal of the used absorbent, 89.6% wrap in paper and disposed with routine waste. 4.7% buried in soil, 3.7% flushed in toilet and 6 2% burned it. (Table:4)

Restrictions practiced during menstruation, 74.6% followed one or the other restrictions. Restrictions like going to religious place 70.8%, sleeping separately 39.6%, playing sports 28.9%, going to school 17.8%, household work 9.1% and entry to kitchen 7.7%. (Table: 5)

Tables:

Table 1: Sociodemographic characteristics of adolescent girls

	Number (n=298)	Percentage (%)
Age Group		
Early Adolescence (10-14 years)	126	42.3
Late Adolescence (15-19 years)	172	57.7
Religion		
Hindu	243	81.5
Christian	52	17.4
Muslim	03	1.0
Education of mother		
Illiterate	38	12.8
Primary	31	10.4
Secondary	129	43.3
Higher secondary	52	17.4
Degree and above	48	16.1

Table 2: Menstruation history of study participants

	Number (n=298)	Percentage (%)
Age at Menarche (years)		
11-12	187	62.8
13-14	91	30.5
15-16	16	5.4
> 16	04	1.3
Duration of flow (days)		
<3	151	50.7
3-5	143	48.0
>5	4	1.3
Regularity of Menses		
Regular	235	78.9
Irregular	63	21.1

Table 3: Knowledge of study participants regarding menstruation

		Number	Percentage(%)
Knew about Menstruation before Menarche?	Yes	204	68.5
	No	94	31.5
Reaction to FirstMenstruation	Discomfort	126	42.3
	Emotional	42	14.1
	Happy	24	8.1
	Scared	106	35.6
Knowledge about Menstruation	Physiological process	216	72.5
	No information	82	27.5
Source of Information*(n=216)	Mother	124	41.6
	Sister	67	22.5
	Friends	98	32.9
	Teachers	52	17.4
	Internet/online	12	4.0

* Multiple responses

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Table 4: Menstrual hygiene practices followed by the study participants

	Number (n=298)	Percentage (%)
Absorbent used		
Sanitary Napkin	281	94.3
Cloth	17	5.7
Frequency of change (Hrs)		
1-3	3	1.0
3-6	218	73.2
6-9	46	15.4
>9	31	10.4
Disposal Method		
Burn	6	2.0
Bury in soil	14	4.7
Flush in toilet	11	3.7
Wrap in paper and throw in dustbin	267	89.6

Table 5: Restrictionsfollowed during menstruation

Types of restrictions*	Number	Percentage (%)
Going to Religious Place	211	70.8
Going to school	53	17.8
Playing Sports	86	28.9
Household work	27	9.1
Sleeping separately	118	39.6
Entry to kitchen	23	7.7
No restrictions	46	15.4

*Multiple responses

Discussion

This cross sectional study among the 298 menstruating adolescent girls in coastal Karnataka shows that majority were in late adolescence (15-19 years) age. Mean age of study participants is 15.9 ± 1.9 years. Similar observations were made by Deshpande, et al in a study in Karad where 72% were in age group 15–19 years,[7]Jain et al in their study at Faridabad found67.55% girls were between 14-16 years.[8]Another study by Sudeshna et al in a study in Kolkata where 57%girls belonged to 15–19 years age group.[9]

Most of the mothers of study participants were educated till secondary school (43.3%) and education till degree or above (16.1%). The overall literacy status among mothers of study participants is 87.2 % which correlates with female literacy of karwar taluka of 84.8%.[14] Similarly other studies by Bachloo T et al 87.4%,Jailkhani SM et al 80.6% ,Thakre SB et al 92.5%, Rokade HG et al 97.8%, Patavegar BN et al 92.9% respectively were observed.[10,15-18]

In Indian society discussion related to menstruation and its hygiene is still considered a taboo. In the present study, menstruation history reveals that most of them attained menarche between 11-12 years. Mean age of menarche of study participants is 12.7 years. Bachloo T et al12.2 years, Sharma R et al12.8 years, Dasgupta A et al 12.8 years and Thakre SB et al 12.9 years reported these mean age of menarche in their similar community based studies.[10,11,13,16] Whereas Jain R et al and Sharma S et al[12]reported13.4 yearsand 11.4 years asmean age of menarche.[8,12]Genetic, nutritional, environmental and geographical factors could have influenced in such variations in mean age of menarche. Pathak PK et al in their secular trends in menarche al age in India documented that age at menarche is been declining trend in India from 13.8 years in 1972 to 12.4 years in 2011.[19]

The duration of blood flow was <5 days in 98.7% and >5days in 1.3% ofthe girls which is again comparable to study by Deshpande et al, Kanotra et al and Patil MS et al.[7,20,21]Regularity of menstruation in our study shows that majority of them had regular menses. Deshpande et al in their study found 82% having regular menses.[7]Kanotra et al observed that 94.4% had regular menstrual cycles.[20]Wasnik et al found that 78.2% had regular menstrual cycles.[22]

Knowledge regarding menstruation, 68.5% of study participants knew about menstruation before menarche. It was observed that majority knew that menstruation was a physiological process. Mothers were the major source of information followed by friends. The awareness of menstruation before menarche reported by Dasgupta A et al 67.5%,Juyal Ret al 64.5%, Jailkhani MK et al 63.4% andKumar D et al 60.2% are comparable to the present study.[13,15,23,24]

Where as many similar studies found less percentage of adolescents knowing about menstruation before attainment of menarche like Deshpande et al 24%, Thakre SB et al 36.95% and Bachloo T et al 41.5%.[7,10,16] Majority studies found that main informant was mothers and menstruation is a physiological process. These wide variations could be due to differences in the female literacy status (mothers of adolescent girls) in these geographical areas.

The higher percentage of adolescent girls knowing about menstruation before menarche in the present study could be correlated to the higher literacy rate among those mothers of these adolescent girls. This study also highlights that only 17.4% took information from teachers, which is a neglected issue because adolescence education programme co-ordinated by the NCERT under MHRD aims to provide adolescents with accurate, age appropriate and culturally relevant information on menstrual hygiene.[25] In the present-day world of smart phones and internet it was unfortunate to see that very few (4%) accessed information from Internet/online.

The present study documented reactions to first menstruation like discomfort, scared, emotional and happy as responses as in Table:3. Deo DS et al and Patle R et al in their studies have also documented similar reactions like scare, indifference, discomfort, disgust, guilt, surprise, pleasure, depression and fear.[26,27]

In the present study majority (94.3%) used sanitary napkins as absorbent. Similar findings were found by Kanotra SK et al 89.5%, Patavegar BN et al 85.9%, Jain R et al 78.7%, Mathiyalagen, et al 78.1%, using sanitary napkins as absorbent.[8,18,20,30] Most (73.2%) of the study participants change of absorbent every 3-6 hours which was higher compared to findings in study done by Patavegar BN et al 40.2%.[18] Comparable findings were found by Rokade HG et al 62.96%.[17]

Regarding the method of disposal of the used absorbent, 89.6% wrap in paper and disposed with routine waste, other methods being burying in soil, flushing in toilet and burning. Wide variations were observed in regard to disposing the absorbent with routine waste from Thakre SB et al 39.8%, Patle R et al 52.8%, Dasgupta A et al 57.5% to Patavegar BN et al 89.8%.[13,16,18,27]

Present study reveals that 74.6% did face one or the other restrictions like going to religious place (70.8%), sleeping separately (39.6%), playing sports (28.9%), going to school (17.8%), household work (9.1%) and entry to kitchen (7.7%). Similar restrictions were also observed by Deshpande et al, Sudeshna R et al, Bachloo T et al, Sharma S et al, Dasgupta A et al, Thakre SB et al, Rokade HG et al and Patavegar BN et al ranging from going to religious place, to play or exercise, eating certain food items, doing kitchen work, doing routine household work, going to school, sleep on the routine bed, to touch anybody, etc.[7-13,16-18]

Conclusion

Mean age of menarche 12.7 ± 1.7years which is also a sign of normal functioning reproductive system. Literacy among mothers of adolescent girls is good. Majority knowing about menstruation before menarche and understanding that it is a physiological process. Such knowledge being given by their mothers. Correlating that education among the mothers will lead to imparting life science information. Majority using sanitary napkins as absorbent. Sill the myths associated with it like the age old practice of following certain restriction during menstruation is observed in present study also. GOI's Adolescence Education Programme in school curriculum with teachers playing influential role in imparting reproductive health knowledge could make achieve SDG 6.2 by 2030.

References

1. Empowering adolescent girls and boys in India Available at: https://www.unicef.org/india/what-we-do/adolescent-development-participation Accessed December 15, 2021.

Prashant M Naik, Akankshya Panda, Abhishek M Prayag et. al. / Menstrual Hygiene and Myths
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2. Menstrual hygiene,Available at: https://www.unicef.org/wash/menstrual-hygiene Accessed December 15, 2021.

3. YasminS, MannaN, MallikS, AhmedA, PariaB. Menstrualhygiene among adolescent school students: An in-depthcross-sectionalstudyinanurbancommunit yofWestBengal,India.IOSRJDentMedSci2013;5:22-6.

4. WHO/UNICEF (2012) Consultation on draft long list of goal, target and indicator options for future global monitoring of water, sanitation and hygiene. Available at https://washdata.org/sites/default/files/documents/reports/2017-06/JMP-2012-post2015-consultation.pdf Accessed December 15, 2021.

5. UNICEF, Guidance on Menstrual Health and Hygiene, Programme Division/WASH 3 United Nations Plaza New York, NY 10017 USA, March 2019, p 15.

6. SharmaS, MehraD, KohliC, SinghMM. Menstrualhygienepractices among adolescent girls in a resettlement colonyof Delhi: A cross-sectional study. Int J ReprodContraceptObstetGynecol2017;6:1945-51.

7. Deshpande TN, Patil SS, Gharai SB, Patil SR, Durgawale PM. Menstrual hygiene among adolescent girls – A study from urban slum area. J Family Med Prim Care 2018;7:1439-45.

8. Jain R, Anand P, Dhyani A, Bansal D. Knowledge and awareness regarding menstruation and HIV/AIDS among schoolgoing adolescent girls. J Family Med Prim Care 2017;6:47-51.

9. Sudeshna R, Aparajita D. Determinants of menstrual hygiene among adolescent girls: A multivariate analysis. Natl J Community Med 2012;3:294-301.

10. Bachloo T, Kumar R, Goyal A, Singh P, Yadav SS, Bhardwaj A, et al. A study on perception and practice of menstruation among school going adolescent girls in district Ambala Haryana, India Int J Community Med Public Health 2016;3:931-7.

11. Sharma R, Negi S, Kunj D, Sharma V. Menstrual hygiene among adolescent girls. Indian J Commun Health 2015;27:376-80.

12. Sharma S, Mehra D, Kohli C, Singh MM. Menstrual hygiene practices among adolescent girls in a resettlement colony of Delhi: cross-sectional study. Int J ReprodContraceptObstetGynecol 2017;6:1945-51.

13. Dasgupta A, Sarkar M. Menstrual hygiene: How hygienic is the adolescent girl? Indian J Commun Med 2008;33:77.

14. ZillaPanchayatUttara Kannada District Overview Available at: http://www.zpkarwar.kar.nic.in/docs/publication/English/EnglishPart2.pdfAccessed December 15, 2021.

15. Jailkhani SM, Naik JD, Thakur MS, Langre SD, Pandey VO. Patterns & problems of menstruation amongst the adolescent girls residing in the urban slum. Sch J App Med Sci 2014;2:529-34.

16. Thakre SB, Thakre SS, Reddy M, Rathi N, Pathak K, Ughade S. Menstrual hygiene: Knowledge and practice among adolescent school girls of Saoner, Nagpur district. J ClinDiagn Res 2011;5:1027-33.

17. Rokade HG, Kumavat AP. Study of menstrual pattern and menstrual hygiene practices among adolescent girls. Natl J Community Med 2016;7:398-403.

18. Patavegar BN, Kapilashrami MC, Rasheed N, Pathak R. Menstrual hygiene among adolescent school girls: An in-depth cross-sectional study in an urban community. IntJ Health Sci Res 2014;4:15-21.

19. Pathak PK,Tripath I N, Subramanian SV. Secular Trends in Menarcheal Age in India-Evidence from the Indian Human Development Survey PLoS One. 2014; 9(11): e111027.

20. Kanotra S, Bangal V, Bhavthankar D. Menstrual pattern and problems among rural adolescent girls. Int J Biomed Adv Res 2013;4:551-4.

21. Patil M S ,Angadi M M.. Menstrual pattern among adolescent girls in rural area of Bijapur. Al Ameen J Med Sci 2013; 6(1) :17-20.

22. Wasnik VR, Dhumale D, Jawarkar AK. A study of the menstrual pattern and problems among rural school going adolescent girls of Amravati district of Maharashtra, India. Int J Res Med Sci 2015;33:1252-6.

23. Juyal R, Kandpal SD, Semwal J, Negi KS. Practices of menstrual hygiene among adolescent girls in a district of Uttarakhand. Indian J Commun Health 2012;24:124-8.

24. Kumar D, Goel NK, Puri S etal.Menstrual Pattern amongUnmarried Women from northern India. J ClinDiagn Res2013;7(9): 1926-29.

25. Amrita Dey.Formal And Informal Sexuality Education: A Study of Kolkata,Department of Sociology,Jadavpur University, Kolkata 700032, West Bengal, India, 2015, p 210.

26. D.S. Deo, C.H. Ghattargi Perceptions and Practices Regarding Menstruation: A Comparative Study in Urban and Rural Adolescent Girls. Indian Journal of Community Medicine Vol. 30, No. 1, January-March, 2005, 33-34.

27. Patle RA, Kubde SS. Comparative study on menstrual hygiene in rural and urban adolescent. Int J Med Sci Public Health 2014;3:129-32.

A Study to Develop a Costing Model for Satellite Haemodialysis Unit for a Tertiary Care Hospital

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Abstract

End stage renal disease (ESRD) is a significant health problem worldwide. Nearly 220000 patients are diagnosed with end stage renal disease every year, which calls for an additional demand of 34 million dialysis sessions in India. There is a rapid increase in the ESRD population worldwide. Furthermore approximate 70% of those who starts dialysis in India given up dialysis due financial constraints or death.

Considering the need of the Satellite haemodialysis unit (SHD) for ESRD patients, 'A studyto develop a costing model for SHD unit" was undertaken. A prospective study was conducted in a tertiary care hospital.The aim of the research was to analyse the need of SHD unit among dialysis patients and to suggest costing model for the tertiary care hospital. The methodology involved survey to address the patients need and perception towards SHD unit, direct observation, informal interview, bottom –up approach of costing method to identify the various cost involved in SHD unit and expert opinions. A total sample size of 120 ESRD patients in in - centre dialysis unit was selected for the study. As per the survey 30 patients need satellite haemodialysis unit. The study provides a cost analysis of 5 bedded SHD unit in the chosen tertiary care hospital. The author provides costing model recommendation for the development of SHD unit based on interpretation of data and expert opinions.

Keywords: Haemodialysis, End stage renal disease, Cost analysis, Satellite haemodialysis unit, Patient's views, Dialysis Modality.

Introduction

In India the burden of end stage renal disease (ESRD) is increasing dramatically and the proportion of death due to kidney failure is rising from 2.1% in 2001-3 to 2.9% in 2010 -13[10].Renal replacement therapy available for ESRD patients is haemodialysis.

[11]. All over the country India has close to 950 nephrologist. 10% of Indian patients who develop ESRD currently receive RRT, often for reason of cost[9]. There are 700 dialysis centers with total 4000 dialysis machine mainly in private sector.Satellite haemodialysis units are thosehaemodialysis (HD) units which do not have an onsite nephrologist and

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treat patients who are not hospitalized. Constructing SHD units increased access to renal care for ESRD patients and reduced travel time for HD patients[6],[14].. These units are affiliated with regional renal centre and nephrologists from regional centre are responsible for the care of patients treated in SHD unit[16].Satellite HD units are offering dialysis facility with no admission facility and offer the dialysis at reasonable price by cutting down the overheads.

Economic Evaluation of Haemodialysis Treatment and Dialysis Provision

Dialysis is an expensive therapy i.e. it is high cost, and to support the life of indudual with end-stage renal disease, SHD is necessary. Haemodialysis service offered by the private sector can be afforded only the higher income patients, (according to socio economic status of patient)[20].The low economic status patients have higher death rate and loss of follow-up[8],[13].The cost to establish SHD units are varied due to the differences in size, potential for expansion and property cost[2]. Based on studies in India, direct medical cost of haemodialysis is 80.7%[20].

Direct operational cost formed a large part of total operational haemodialysis service (89.21%), capital cost is 5.37% and indirect operational cost is 5.16%[19].Direct cost in dialysis service included the capital equipments, staffs, medications, and the building costs. Costing elements were classified in to fixed and variable cost. In India the average cost need for the health system per haemodialysis session is INR 4148[10].

Objectives

1. To assess the patients need and perception towards satellite haemodialysis unit
2. To identify the various costs involved for the development of satellite haemodialysis unit
3. To analyze the cost effectiveness of satellite haemodialysis unit
4. To suggest a costing model for tertiary care hospital

Methods and Methodology

A prospective and cross sectional study was carried out in a tertiary care hospital HD unit for a period of six months to analyse the cost involved for the development SHD unit for tertiary care hospital based on the patients need and perception of SHD unit. Primary data has been collected by using survey questionnaire, informal interviews, and checklist (Indian society of nephrology guidelines for HD unit), expert opinion and direct observation. Secondary data has been collected from literature reviews.

Problem solving and Analysis

Random sampling technique was adopted to collect the sample and sample were haemodialysis patients in in –centre hospital. The pretested structured questionnaire after face validation by subject matter experts was administered to 10 HD patients as a pilot survey. A sample size of 120 HD patients were chosen based on the confidence interval 95%, margin of error 10% and ESRD prevalence rate in India (0.8%) as per literature review, using the formula N= (1-p)/.Cronbach's Alpha has been done for the study and the value obtained is 0.702 which show alpha coefficient of reliability is acceptable for the research.The Pearson correlation coefficient (r) obtained is 0.448 at a level 0.01 (p value) which states that there is a weaker correlation between the two variables (perception and willingness). The costing model was developed for 5 bedded SHD unit working in six days in a week with 3 shifts per day based on number of patients (30) willingness to prefer SHD unit. Most of the patients are from similar locality, travel distance has been taken (6-15 KM).

Results and Interpretation

Based on the study, large part of total operational haemodialysis cost were the direct operational costs followed by indirect costs.

Analysis on SHD unit Costing Elements

Calculation of Cost of Project

Table 1. Cost of project

Expenditure	Cost (INR)		
	Rent	**Lease**	**Own**
Total Capital Expenditure	6439745	106,83,745	211,83,745
Total Working Expenditure (INR)	9845684	9089684	9089684
Total cost of project (INR)	16285429	197,73,429	302,73,429

The above table shows the cost of project for rent, lease and own SHD units.

Cost of Project = Total Capital Expenditure + Total Working Expenditure

Calculation of Means of Financing

Means of financing has been included own capital with borrowed capital (from bank)Assumption:The percentage of contributions has been taken as 100%, 75%, 50% and 25%.

Calculation of Estimation of Loan Amount

Estimation of loan amount has been calculated for 25%, 50% and 75% of repayment loan of borrowed capital with payment period of 5 years, 10 years and 15 years respectively.

Assumption: Interest remains constant in all years (11.2%).

Calculation of Income Estimation

The price of HD session has been taken as 2000 – 4000 INR.

Income Estimation = Price per HD session * Number of dialysis.

Assumption: The number of dialysis per year remains constant (4320).

Calculation of HD price

Table 2: Price per HD session

	Rent	Lease	Own
Working capital expenditure (INR)	9845684	9089684	9089684
Number of dialysis sessions per year	4320	4320	4320
Cost per HD session (INR)	2279	2104	2104
Profit per HD session (INR)	221 (8.8%)	396 (15.8%)	396 (15.8%)
Price (INR)	2500	2500	2500

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The above table shows the price per HD session in SHD unit. It has been taken as 2500 RS.

Price per HD session = Cost per HD session + Profit.

Calculation of Payback Period
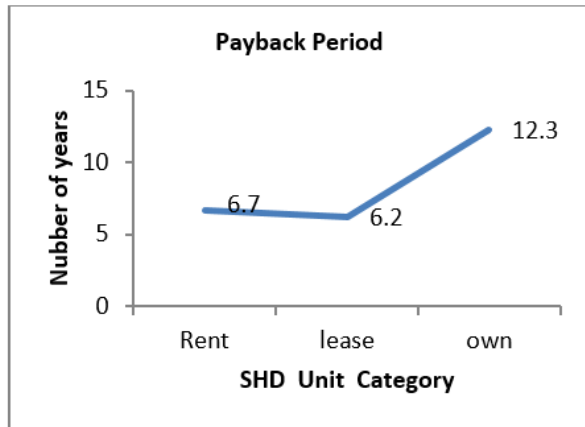
Figure 1. Payback Period

The above graph showing the payback period of rent, lease and own SHD units.

Payback Period = Capital Investment/ Net Cash inflow (Profit)

Breakeven Point

Table 3: Breakeven Analysis

Particulars	Rent	Lease	Own
Total cost (Fixed cost + Variable cost)	16285436	19773436	30273436
Sales	10800000	10800000	10800000
Number of dialysis	4320	4320	4320
Selling Price per Dialysis (INR)	2500	2500	2500
Variable cost per Unit (INR)	1801.427	1626.427	1626.427
BEP	12172.34	14592.11	26611.71
BEP Price (BEP* Sales Price per Unit)	30430858	36480265	66529277

The table showing the BEP of SHD units (rent, lease and own). The BEP is showing 12172 HD sessions- rent SHD unit, 14592 HD sessions- lease SHD unit and 26612 –own SHD unit.

Breakeven Point = Fixed Cost / (Selling Price per unit – Variable Cost per Unit.

Discussion

The number of people with ESRD disease grows, the market of HD service is expected to expand. Having this situation, it is necessary to have satellite HD unit. The service charges should be set at least equal to running costs of the organisation because it has to recover the expenses[5].

The primary objective of the study was to determine the need of SHD unit among dialysis patients. The results shows that 30 (25%) of patients from in- centre HD unitneeds the SHD unit.Dialysis treatment requires a greater focus on patient's preference[12].Based on this result cost analysis of SHD unit has done for 5 bedded SHD unit.Second objective was to determine the various costs involved for the development of SHD unit. These costs increase proportionally with the number of dialysis. The fixed cost is not increases with the number of dialysis[15]. The methodology used for the study has been followed by the costing methodology used by other researchers[9],[17],[7], [10]. The third and fourth objectives were to analyse the cost effectiveness of SHD unit and to suggest a costing model to develop SHD unit respectively. The study results shows that rent and lease based SHD is more cost effective than own SHD unit. The main cost driver for the HD were direct operational cost associated with running unit and it is formed large part of total operational cost[18]. Based on the studies equipments, building and facility cost are large part of total operational cost. Break even analysis helps to calculate the average profit or loss per dialysis depending on the number session per month or year[15].Strength of this study are, standard methods were used for data collection i.e. the methodology used for the study have been used other researchers, Actual costs have been taken to develop costing model and expert opinions were incorporated in the study to develop costing model. Limitation of our study is it was conducted in single centre because of the time constraint.

Recommendation

Table 4. Costing Model to Develop SHD unit

	Rent	Lease	Own
Cost of Project (INR)	162,85,436	197,73,436	302,73,436
Means of Finance (INR)			
Own capital 100%	16285429	19773429	30273429
Borrowed capital 0%	0	0	0
Own capital75%	12214072	14830072	22705072
Borrowed capital 25%	4071357	4943357	7568357
Own capital 50%	8142715	9886715	15136715
Borrowed capital 50%	8142715	9886715	15136715
Own capital 25%	4071357	4943357	7568357
Borrowed capital 75%	12214072	14830072	22705072
Estimation of Loan (INR)			
5 years for 25%	1270263.38	1542327.38	2361327.38
10 years for 50%	1726255.58	2095983.58	3208983.58
15 years for 75%	2182247.52	2649639.52	4056639.52
Income Estimation (INR)	10800000	10800000	10800000
Payback period (In year)	6.7	6.2	12.3
Break Even Point (Dialysis sessions)	12172	14592	26612
Break Even Period (In year)	2.8	3.3	6.1

The above costing model has been suggested for the hospital to develop a satellite haemodialysis unit. The model has developed for one year. It has been developed for 5 bedded dialysis unit working in 3 shifts per day with 6 days in a week, expert opinions were incorporated.

- Based on the analysis of the research the following recommendations are suggested:

- Hospital can focus on extending HD care by having SHD unit to HD patients

- It was felt that there is a need of SHD unit for HD patients

- The SHD unit must be provided HD care with better facilities, affordable cost and best treatment

- The SHD unit should be rent / lease based, it is more cost effective than own SHD unit and to reduce the cost of project the hospital can go by rent SHD unit

- The dialysis cost should be start from the range of 2500RS

Conclusion

The results showed that there is a need of SHD unitfrom in-centrehaemodialysis unit. The cost information is needed to the management to develop SHD unit, it helps to make decisions. (Table 1) shows

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the various costs involved for the development SHD unit.From Result it is clear that rent or lease based SHD unit are more cost effective than own SHD unit. From the table given in (Table 1) we can see that the total capital expenditure for the rent SHD unit is lower compared to lease and own SHD units. Similarly in case of payback period (Figure1) we can see that the rent and lease SHD units are showing lower payback period than own SHD unit. From the breakeven analysis (Table3) we can understand that the number of dialysis sessions needed for rent and lease SHD units for breakeven is lower and BEP period is lower for these units compared to own SHD unit. Overall the rent and lease based SHD units is much better than compared to own SHD unit.

To conclude, cost information is a tool which is useful in setting priorities of various course of action to meet objectives and allocate the resources to facilities and service[4]. Majority of dialysis patients to undergo the irregular haemodialysis treatment due to the inaccessibility of HD units[1], [3]. It is very much essential to establish a SHD unit from in-centre to provide a holistic care to HD patients.

Future Directions:

Further research is needed to identify cost effectiveness of HD service between in-centre and satellite haemodialysis unit from patient's perspective. Also the clinical outcomes of the care provided in the SHD unit as compared to main unit.

Ethical clearance

It has been taken from the institution,publication committee.

Source of funding- Self

Conflict of Interest - Nil

References

1. Agarwal SK, Srivastava RK. Chronic kidney disease in India: challenges and solutions. Nephron clinical practice. 2009;111(3):c197-203.

2. Baboolal K, McEwan P, Sondhi S, Spiewanowski P, Wechowski J, Wilson K. The cost of renal dialysis in a UK setting—a multicentre study. Nephrology Dialysis Transplantation. 2008 Jan 3;23(6):1982-9.

3. Bhowmik D, Tiwari SC. Challenges of hemodialysis in India. J Int Med Sci Acad. 2012;25(2):99-100.

4. Chatterjee S, Levin C, Laxminarayan R. Unit cost of medical services at different hospitals in India. PLoS One. 2013 Jul 23;8(7):e69728.

5. Cleemput I, De Laet C. Analysis of the costs of dialysis and the effects of an incentive mechanism for low-cost dialysis modalities. Health Policy. 2013 May 1;110(2-3):172-9.

6. Diamant MJ, Harwood L, Movva S, Wilson B, Stitt L, Lindsay RM, Moist LM. A comparison of quality of life and travel-related factors between in-center and satellite-based hemodialysis patients. Clinical Journal of the American Society of Nephrology. 2009 Dec 17:CJN-05190709.

7. Ferguson TW, Zacharias J, Walker SR, Collister D, Rigatto C, Tangri N, Komenda P. An economic assessment model of rural and remote satellite hemodialysis units. PloS one. 2015 Aug 18;10(8):e0135587.

8. Georgi AB, Jayaseelan T, Milly MA, Padma P, Saravanan AK, Nancy LE, Yuvaram NR, Saravanan S, Yogesh NR. Resource settings have a major influence on the outcome of maintenance hemodialysis patients in South India. Hemodialysis International. 2010 Apr;14(2):211-7.

9. Jha V, John O, Joshi R, Kotwal S, Essue B, Jan S, Gallagher M, Knight J. Dialysis outcomes in I ndia: A pilot study. Nephrology. 2015 May;20(5):329-34.

10. Kaur G, Prinja S, Ramachandran R, Malhotra P, Gupta KL, Jha V. Cost of hemodialysis in a public sector tertiary hospital of India. Clinical Kidney Journal. 2017

11. Khanna U. The economics of dialysis in India. Indian journal of nephrology. 2009 Jan;19(1):1.

12. Lee A, Gudex C, Povlsen JV, Bonnevie B, Nielsen CP. Patients' views regarding choice of dialysis modality. Nephrology Dialysis Transplantation. 2008 Jun 27;23(12):3953-9.

13. Maripuri S, Arbogast P, Ikizler TA, Cavanaugh KL. Rural and micropolitan residence and mortality in patients on dialysis. Clinical Journal of the American Society of Nephrology. 2012 Apr 19:CJN-10831011.

14. Moist LM, Bragg-Gresham JL, Pisoni RL, Saran R, Akiba T, Jacobson SH, Fukuhara S, Mapes DL, Rayner HC, Saito A, Port FK. Travel time to dialysis as a predictor of health-related quality of life, adherence, and mortality: the Dialysis Outcomes and Practice Patterns Study (DOPPS). American Journal of Kidney Diseases. 2008 Apr 1;51(4):641-50.

15. Mushi L, Krohn M, Flessa S. Cost of dialysis in Tanzania: evidence from the provider's perspective. Health economics review. 2015 Dec 1;5(1):28.

16. Prakash S, Austin PC, Oliver MJ, Garg AX, Blake PG, Hux JE. Regional effects of satellite haemodialysis units on renal replacement therapy in non-urban Ontario, Canada. Nephrology Dialysis Transplantation. 2007 Apr 4;22(8):2297-303.

17. Ranasinghe P, Perera YS, Makarim MF, Wijesinghe A, Wanigasuriya K. The costs in provision of haemodialysis in a developing country: a multi-centeredstudy. BMC nephrology. 2011 Dec;12(1):42.

18. Rezapoor A, Azar FE, Safari H, Arabloo J. Cost Analysis of Services Delivered to Patients with End-Stage Renal Disease referring to Bou-Ali-Sina Hospital Affiliated to Qazvin University of Medical Sciences. World Applied Sciences Journal. 2012;18(6):796-802.

19. Soroka SD, Kiberd BA, Jacobs P. The marginal cost of satellite versus in-centerhemodialysis. Hemodialysis International. 2005 Apr;9(2):196-201.

20. Suja A, Anju R, Anju V, Neethu J, Peeyush P, Saraswathy R. Economic evaluation of end stage renal disease patients undergoing hemodialysis. Journal of pharmacy &bioallied sciences. 2012 Apr;4(2):107

Prevalence of Psychological Stress among Undergraduate Medical Students in Southern District of Karnataka

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Abstract

Background: Medical students experience more stress because of the vast medical syllabus, immense academic workload, inter and intrapersonal issues and motivation-related hurdles, financial and personal reasons.

Objectives: To assess the prevalence of stress and stressors among undergraduate medical students and to find thefactors affecting their levels of stress.

Methodology: A cross-sectional study was conducted among Phase 1 to 3 medical students of Kodagu Institute of Medical Sciences, Madikeri, Karnataka for a period of 2 months. The data was collected using standard Medical Student Stressor Questionnaire and Perceived Stress Scale questionnaire.

Results: Out of 386 students 16.6%,76.7% and 6.7% of the students were suffering from High, Moderate and Low stress respectively. Academic-related stressors were causing more stress and least by Drive and Desire Related Stressors. Medical students with >20 years of age group, females, final year students, and occupation of their father being doctor showed significant association with the level of stress

Conclusion: In our study, 93.3% of the students were suffering from stress. Academic-related stressors were the major causes of stress among medical students. Logistic regression analysis depicts that a significant association was present between the level of stress and female students, final year MBBS students.

Keywords: Medical students, Psychological Stress, Perceived stress, Stressors.

Introduction

All over the world medical profession is considered an esteemed profession. It is an immense dream for parents of many students and pre-university students to get into the medical course. But as they enter into the course theywill start experiencing stress because of the vastmedicalsyllabus, hefty academicworkload, high academic and parentexpectations, long study hours, and tough competition among students. Many other factors like teaching style, inter and intrapersonal issues, drive and motivation-related

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troubles, lack of leisure time, financial problems and personal reasons such as emotional and family problems may also add-up to the distressed state of the students.[1,2]

The perception of stress is a highly subjective phenomenon so each person has different levels of stress. Psychological stress is defined as "The unique discomforting, emotional state experienced by an individual in response to a specific stressor or demand that results in harm, either temporary or permanent, to the person".[1] If this is experienced by students it will have a negative impact on their mental health status which leads to sleep deprivation, reduced concentration, lack of confidence, substance abuse, anxiety, interpersonal conflict, depression,suicidal attempts, etc.

From the previous studies, it is estimated that the prevalence of stress among medical students is 28.5–78%.[2] Multiple studies have disclosed that significantly high-stress level was noticed among medical students and high stress has been reported in multiple countries[3-5] and more than half of the medical students were found to be affected by depression, anxiety, and stress.[6]

In India, only a few studies have been conducted tofind theprevalence of stress and stressors among medical students by using different methods. The current study was done to assess the prevalence of stress and stressors among undergraduate medical studentsand to find the factors affecting their levels of stress.

Methodology

A cross-sectional study was conducted among Phase 1 to Phase 3 medical students which include all term students of Kodagu Institute of Medical Sciences, Madikeri, Karnataka for a period of 2 months by nonprobability sampling method. The data was collected by using the standard Medical Student Stressor Questionnaire(MSSQ) and Perceived stress scale questionnaire(PSS). Ethical clearance was taken by the Institutional ethical committee of Kodagu Institute of Medical Sciences, Ref id: KoIMS/IEC/24/2021-22.Informed written consent was obtained from the students after explaining the study procedure.The participation of students was voluntary, and they were guaranteed about confidentiality.

The questionnaire includes socio-demographic characteristics of the students, six domains of stress-related questions of the standard Medical Student Stressor Questionnaire (MSSQ) to find out the stressors and level of stress, and 10 questions from the Perceived Stress Scale(PSS) to find out the prevalence of stress.A stressor is defined as a personal or environmental eventthat causes stress and these stressors were categorized as 6 domains of stress. Finally combining all these 6 domains of stress in a single questionnaire is the Medical Student Stress Questionnaire. Six domains of stress in MSSQ are: Academic Related Stressors (ARS), Interpersonal and Intrapersonal Related Stressors (IRS), Teaching and Learning Related Stressors(TLRS), Social Related Stressors(SRS), Drive and Desire Related Stressors(DRS), Group Activities Related Stressors(GARS) and each domain have many questions and each question has 5 responses. In MSSQ the responses will be marked from causing no stress at all as 0 to causing severe stress as 4. Mean domain score was calculated and classified it as 0.00 – 1.00 = Mild stress, 1.01 – 2.00 = Moderate stress, 2.01 – 3.00 = High stress& 3.01 – 4.00 = Severe stress[7]. The perceived stress scale consists of 10 questions and each question has 5 responses and which were marked from 0 as never to 4 as very often and scores were classified as 0-13=low stress, 14-26 = moderate stress, and 27-40 = high perceived stress.[8]

Statistical analysis: It was done by using Microsoft Excel and SPSS 25 software.The data was entered in the Microsoft Excelspreadsheet. Percentage andMean domain score was calculated. The Chi-square test was used for testing the significance between levels of stress and socio-demographic factors. Logistic regression was used to adjust the confounding factors.

Results

The present study was conducted among Phase 1 to Phase 3 medical students of Kodagu institute medical sciences, Madikeri. Total 386 students have given consent and participated. Out of 386 students, 43.8% of the students belongs to ≤20 years of age

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group and 56.2% of the students belongs to >20 years. 202(52.3%) were boys and 184(47.7%)were girls. 26.4%of the students were studying in 1st Year MBBS, 26.4%, 28.5% ,and 18.7% of the students were studying in 2nd year, 3rd year, and 4th year MBBS respectively. Among all, 10.4% of the student's father were being doctors.

According to Perceived Stress Scale, the majority (76.7%) of the students were suffering from Moderate levels of stress and 16.6% of the students were suffering from high stress [Graph 1].
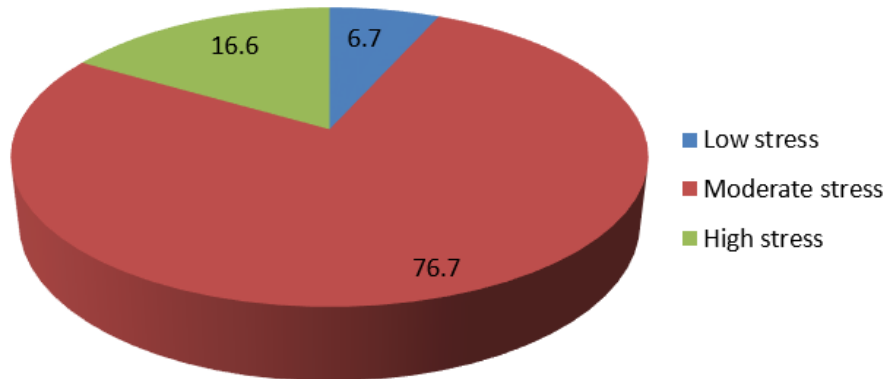
Graph 1: Prevalence of stress among Medical students.

In this study majority of the students were consider academic-related stressors (mean score 2.27±0.89) were causing more stress followed byTeaching and Learning Related Stressors(mean score 1.69±0.89) and least by Drive and Desire Related Stressors (mean score 1.29±0.96)[Table1].

Table 1: Percentage of stress among different domains.

Domains of stress	Stress		Mean score (Mean ±SD)
	Yes	**No**	
Academic Related Stressors (ARS)	99.5%	0.5%	2.27±0.89
Interpersonal and Intrapersonal Related Stressors(IRS)	97.7%	2.3%	1.47±0.84
Teaching and Learning Related Stressors(TLRS)	98.2%	1.8%	1.69±0.89
Social Related Stressor(SRS)	97.9%	2.1%	1.59±0.78
Drive and Desire Related Stressors(DRS)	90.2%	9.8%	1.29±0.96
Group Activities Related Stressors(GARS)	97.2%	2.8%	1.89±0.92

Note: SD – Standard Deviation

Out of 386 students, severe and high level of stress was found among 61% of the students

due to Academic related stressors.Social Related Stressors(SRS) were causing the prevalent moderate level of stress among 50.5% of the students.[Table 2]

Table 2: Levels of stress and different Domains

Classification	Academic Related Stressors	Interpersonal and Intrapersonal Related Stressors	Teaching and Learning Related Stressors	Social Related Stressors	Drive and Desire Related Stressors	Group Activities Related Stressors
Mild	10.6%	36.0%	27.2%	25.9%	50.5%	23.1%
Moderate	27.7%	37.0%	39.6%	50.5%	31.1%	35.8%
High	42.0%	22.5%	27.2%	18.9%	13.0%	32.4%
Severe	19.7%	4.4%	6.0%	4.7%	5.4%	8.8%

Levels of stress from all 6 domains were categorized as mild stress in one category and moderate, high, and severe stress in another category. The Association between socio-demographic factors and the level of stress was calculated. Age, sex, Year of studying, and Father's occupation show significant association with the level of stress [Table 3].

Table 3: Association between socio-demographic factors and level of stress (MSSQ).

Variables		Mild stress	Moderate, High, and severe stress	Chi-square value	p-value
Age	≤20 years	40(23.7%)	129(76.3%)	3.924	0.048
	>20 years	34(15.7%)	183(84.3%)		
Sex	Male	51(25.2%)	151(74.8%)	10.098	0.001
	Female	23(12.5%)	161(87.5%)		
Year of studying	1st year	28(27.5%)	74(72.5%)	11.826	0.008
	2nd year	18(17.6%)	84(82.4%)		
	3rd year	23(20.9%)	87(79.1%)		
	4th year	5(6.9%)	67(93.1%)		
Father Occupation	Medico	3(7.5%)	37(92.5%)	3.923	0.048
	Non-medico	71(20.5%)	275(79.5%)		
Mother Occupation	Medico	2(10.05)	18(90.0%)	1.145	0.285
	Non-medico	72(19.7%)	294(80.3%)		
Habits	Yes	2(18.2%)	9(81.8%)	0.007	0.933
	No	72(19.2%)	303(80.8%)		
Hobbies	Yes	68(20.2%)	268(79.8%)	1.906	0.167
	No	6(12.0%)	44(88.0%)		

When Logistic regression analysis was applied to find out the association between the significant variables and level of stress we found that female students(AOR: 2.316, 95%CI: 1.331-4.032 and p-value: 0.003), final year MBBS students (AOR: 3.563, 95% CI: 1.070-11.861, p value:0.038) were associated with moderate to severe levels of stress [Table 4].

Table 4: Logistic regression among different variables and level of stress(MSSQ)

Variables		Mild stress	Moderate, High, and severe stress	AOR*(95% CI**)	p-value
Age	≤20 years	40(23.7%)	129(76.3%)	1.166 (0.575 - 2.365)	0.671
	>20 years	34(15.7%)	183(84.3%)		
Sex	Male	51(25.2%)	151(74.8%)	2.316 (1.331-4.032)	0.003
	Female	23(12.5%)	161(87.5%)		
Year of studying	1st year	28(27.5%)	74(72.5%)	3.563 (1.070-11.861)	0.038
	2nd year	18(17.6%)	84(82.4%)		
	3rd year	23(20.9%)	87(79.1%)		
	4th year	5(6.9%)	67(93.1%)		
Father Occupation	Medico	3(7.5%)	37(92.5%)	0.532 (0.147-1.924)	0.336
	Non-medico	71(20.5%)	275(79.5%)		

Note: * Adjusted Odds Ratio, ** Confidence Interval

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Discussion

Prevalence of low, moderate, and high perceived stress in our study was found to be 6.7%, 76.7%, and 16.6% respectively. This was in comparison with the study done byAgrawal, et al in which 24.3% had low, 65.9% had moderate, and 9.8% had high stress. [9] The percentage of medical students without stress and with mild, moderate, and severe stress was 32%, 24%, 22%, and 21.8%, respectively in a study done by Rafique N.[10] One plausible explanation for this difference in the level of stress could be due to different geographical areas with differences in the curricula, teaching facilities, experience of the teachers, personal problems of the students, and also due to the use of different diagnostic instruments or scales for finding out stress among medical students.

Our study revealed that academic-related stressors (99.5%)were the major source of stress among medical students followed by Teaching and Learning Related stressors (98.2%). This is similarto the findings of a study done in Ethiopia.[11] Our study also showed that high and severe stress was more observed for ARS while mild stress was prevalent for Drive and Desire Related Stressorssimilar findings were found in the study done in South India.[12]

The present study showed that a significant association was present between the level of stress and >20 years age group students. Similar results were found in the study done by Bhavani Nivetha M et al.[13] and Bassols AMS.[14] The reason for this may be as the age increasesthe volume of thestudy also increases which is associatedwiththe high academic workload but this is in contrast with the results from a study done by Kumar et al.[15]where no difference was observed between stress and age groups.

Our study demonstrated thata significant association was noticed between the level of stress and female students. This finding is in agreement with the findings of the other studies[13,16,17] showing that high stress was noted among female students but there was no significant association found.

This study showed a significant association between the level of stress and students studying in final year MBBS which was similarto the results ofthe study done by Ragab E A et al.[2] this may be due to

an increase in the clinical load, curriculum, and fear of failure. This finding contradicts those of Saeed AA,[17] and Kakoli Ghosal[18] who reported first-year students and 2nd year students were showing high stress than the final-year students.

In our study, a significant association was found between stress and students whose parent was in the medical field. A similar result was found in the study Sreeramareddy C, in Nepal.[19] Doctors or medical background parents will expect high results from their children which is the sourceof high stress among the students.But study done by Bhavani Nivetha M et al.[13] shows a low level of stress amongstudents whose parents were doctors compared to non-medical field parents.

After doing logistic regression the present study revealed that female students and final year students showa significant association with the level of stress. Similarly in Ragab et al.[2] study female MBBS students and final year students show Significant association withacademic-related stress. Al-Qahtani MF showed a year of studying was associated with a level of stress.[20]

Conclusion

The current study shows that 76.7% of the students were suffering from moderate stress and 16.6% of the students were suffering from high stress. Academic-related stressorswere causing more stress among medical students followed by Teaching and Learning Related Stressors.>20 years age group students, female,final year students, and parents being in the medicalprofessionwere found to be significantly associated with stress. When Logistic regression analysis was done, female students and final year students showed significant association with the level of stress.

Recommendations:

Academic-related stressors were the major factors causing stress among medical students so we recommend life skill education, time management, and proper study planningshould be given to the students. To reduce the stress among medical students, colleges should implementrelaxation techniques such as Yoga, meditation, and extracurricular activities.

Future larger studies need to be conducted among different medical college studentsin order to have acomprehensiveanalysis report soas to improve the overall mental health status of medical students fromall over the country.

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References

1. Sahu PK, Nayak BS, Rodrigues V, Umakanthan. Prevalence of Psychological Distress among Undergraduate Medical Students: A Cross-Sectional Study. Int J Appl Basic Med Res. **2020 Oct-Dec**;10(4):270–275.

2. Ragab et al. Stress and its correlates among medical students in six medical colleges: an attempt to understand the current situation. Middle East Current Psychiatry (2021) 28:75.

3. Shaikh BT, Kahloon A, Kazmi M, Khalid H, Nawaz K, Khan N, et al.Students, stress and coping strategies: A case of Pakistani medical school. Educ Health (Abingdon) 2004;17:346-53.

4. Saipanish R. Stress among medical students in a thai medical school. Med Teach 2003;25:502-6.

5. Radcliffe C, Lester H. Perceived stress during undergraduate medical training: A qualitative study. Med Educ 2003;37:32-8.

6. Iqbal S, Gupta S, Venkatarao E. Stress, anxiety & depression among medical undergraduate students & their socio-demographic correlates. Indian J Med Res. 2015;141:354-7.

7. Muhamad S B Yusoff, Ahmad F A Rahim and Mohd J Yaacob. The development and validity of the Medical Student Stressor Questionnaire (MSSQ), ASEAN Journal of Psychiatry, Jan-June 2010; 11 (1). Available online at http://www.aseanjournalofpsychiatry.org/oe11105.htm

8. Cohen S, Kamarck T, Mermelstein R. A global measure of perceived stress. J Health Soc Behav 1983;24:386-96.

9. Agrawal N, Sharma H, Dabas A, Mishra A. Perceived Stress Among Medical Students and Doctors in India During COVID-19 Pandemic. MAMC J Med Sci 2021;7:14-20.

10. Rafique N, Al-Asoom LI, Latif R, Al Sunni A, Wasi S. Comparing levels of psychological stress and its inducing factors among medical students.J Taibah Univ Med Sc 2019;14(6):488e494.

11. Melaku L, Mossie A, Negash A. Stress among Medical Students and Its Association with Substance Use and Academic Performance. Journal of Biomedical Education.2015.

12. Tinju James, Richard Sunny, Femina Jose. Analysis of stressors among undergraduate medical students in a teaching medical institution of South India. International Journal of Contemporary Medical Research 2020;7(2):B5-B8.

13. Bhavani Nivetha M, Ahmed M, Prashantha B. Perceived stress and source of stress among undergraduate medical students of Government Medical College, Mysore. Int J Community Med Public Health 2018;5:3513-8.

14. Bassols AMS, Carneiro BB, Siqueira AM, Guimarães GC, Okabayashi LMS, Carvalho FG, Silva ABD. Stress and coping in a sample of medical students in Brazil. Arch Clin Psychiatry. 2015;42(1):1-5

15. Kumar SD, Kavitha HS, Kulkarni P, Siddalingappa H, Manjunath R. Depression, anxiety and stress levels among medical students in Mysore, Karnataka, India. Int J Community Med Public Health. 2016;3:359-62.

16. Seedhom AE, Kamel EG, Mohammed ES, Raof NR. Predictors of perceived stress among medical and nonmedical college students, Minia, Egypt. Int J Prev Med 2019;10:107.

17. Saeed AA, Bahnassy AA, Al-Hamdan NA, Almudhaibery FS, Alyahya AZ. Perceived stress and associated factors among medical students. J Fam Community Med 2016;23:166-71.

18. Kakoli Ghosal*, Abhiram Behera, Study on prevalence of stress in medical students, J Res Med Dent Sci, 2018, 6 (5):182-186

19. Sreeramareddy C, Shankar P, Binu V, Mukhopadhyay C, Ray B, Menezes R. Psychological morbidity, sources of stress and coping strategies among undergraduate medical students of Nepal. BMC Medical Education. 2007;7(1):26.

20. Al-Qahtani MF, Alsubaie AS. Investigating Stress and Sources of Stress Among Female Health Profession Students in a Saudi University. Journal of Multidisciplinary Healthcare 2020;13: 477–484.

Cytological Study of Head and Neck FNAC at a Tertiary Care Hospital Bhopal

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Abstract

Background: FNAC technique is non-toxic, minimally invasive & safer in all age groups of the patient, cost-effective to diagnose benign, tuberculoid and malignancies lesions of Head and neck.

Method: 752 patients of different age groups having enlargement of head and neck swellings which includes lymph node enlargement ,thyroid lesions, salivary lesions and others were studied with FNAC technique. Before FNAC previous concerned clinical history was noted in every patient. AFB test was done whenever required and various clinical manifestations were studied and classified.

Results: 276 (36.7%) enlarged lymph nodes of neck region, 210 (27.9%) thyroid lesions, 182 (24.2%) salivary lesions, 84 (11.1%) and other soft tissue lesions were studied. Again these lesions were evaluated with different clinical findings and classified with percentage.

Conclusion: FNAC technique for head and neck cytology was proved simple, rapid for early diagnose for various pathologies. This pragmatic study will be useful to clinician, surgeon to treat such patients efficiently to avid morbidity and mortality.

Keywords: FNAC, PAP stain, zheil Neelson stain, AFB, lymph-node

Introduction

In day to day clinical practice head and neck mass lesions are frequently observed and spectrum of the these pathological lesion ranging from simple inflammatory to benign, tuberculoid or malignant [1][2]. In the head and neck region, there is accessibility of multiple organs and heterogeneous pathologies hence FNAC (Fine Needle Aspiration cytology) is of great value for early diagnose and planned treatment[3][4] and avoid the surgery in non -neoplastic lesions, inflammatory conditions. FNAC technique is rapid simple cost-effective and minimally invasive procedure for different types of head and neck swellings and after more information about therapeutic approach. MoreoverFNAC technique is non-toxic method, safer to patients of any age group. Hence FNAC technique was carried to evaluate various lesions of Head and Neck because majority of lesions were asymptomatic if neglected may lead to morbidity and mortality of the patients.

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Material and Method

752 patients of different age groups regularly visited to Chirayu Medical College and Hospital, Bairagarh, Bhopal. Madhya Pradesh was studied.

Inclusive Criteria: Patients aged between 5 years to 60 years having enlargement lymphnodes in the head and neck region referred by surgery, medicine and paediatric departments were selected for study.

Exclusive Criteria: Patients already undergone surgery for malignancy and under the treatment of malignancy. Immune compromised patients were excluded from study.

Method

Clinical based study was conducted in the department of pathology, prior to FNAC every patient was examined in detailed with relevant clinical history routine and other special investigation (if required) and local examination of mass was carried out FNAC was performed using 22/23 gauge needle attached to 10 ml plastic disposable syringe. Air dried smears were stained with May Grunewald Giemsa (MCG) and 95% of ethanol fixed smears were stained with papanicolaou (PAP) stain: ZheilNelson stain for AFB was done when ever required, non-aspiration were done wherever required.

The duration of study was between August-2021 to August-2022

Statistical analysis: Various lesions of Head and neck were studied and classified with percentage. The statistical study was carried out SPSS software. the ratio of male and female was 2:1.

Observation and Results

Table-1: Study of different organs / parts by FNAC technique

276 (3.7%) Lymph nodes of Neck region, 210 (27.9%) thyroid lesions, 182 (24.2%) salivary gland lesions, 84 (11.1%) soft tissue lesions

Table-2: Study of lymph nodes with different clinical manifestation

98 (35.5%) tuberculous lymphadenitis, 55 (19.9%) reactive lymphadenitis, 44 (15.9%) supparativelymph nodes, 79 (28.6%) lymphomas and metastastic lymph nodes .

Table-3: Study of Thyroid lesions

68 (32.3%) benign nodular goitre, 25 (11.9%) follicular lesion, 72 (34.2%) Hashimoto thyroiditis, 45 (21.4%) malignant

Table-4: Study of lesion in salivary gland –

88 (48.3%) pleomorphic adenoma, 35 (19.2%) mucoepidermoid carcinoma, 59 (32.4%) chronic sialadentitis

Table-5: Study of lesion in soft tissue

52 (61.9%) Lipoma, 26 (30.9%), 6 (7.14%) Basal cell carcinoma & malignant melanoma.

Table 1: Study of different organs / parts by FNAC technique

No. of patients: 52

Different organs	No. of patients (752)	Percentage (%)
Lymph nodes of Neck region	276	36.7 %
Thyroid lesion	210	27.9 %
Salivary lesion	182	24.2 %
Soft tissue lesion	84	11.1 %

Table 2: Study of lymph nodes with different clinical manifestations

Lesions	No. of patients (276)	Percentage (%)
Tuberculosis lymphadenitis	98	35.5
Reactive lymphadenitis	55	19.9
Suppurative lymph nodes	44	15.9
Lymphoma and Metastastic lymph nodes	79	28.6

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Table 3: Study of Thyroid lesions with percentage

Lesions	No. of patients (210)	Percentage (%)
Benign nodular goitre	68	32.3
Follicular lesion	25	11.9
Hashimoto thyroiditis	72	34.2
Malignant	45	21.4

Table 4: Study of lesions in Salivary gland

Lesions	No. of patients (182)	Percentage (%)
Pleomorphic adenoma	88	48.3
Muco-epidermoid carcinoma	35	19.2
Chronic sialadentitis	59	32.4

Table 5: Study of lesions soft lesion

Lesions	No. of patients (84)	Percentage (%)
Lipoma	52	61.9
Vascular and other spindle cell lesion	26	30.9
Basal cell carcinoma and malignant melanoma	6	7.14

Discussion

Present cytological study of head and neck FNAC in Madhya Pradesh population. Out of 752 patients 276 (36.7%) had enlarged lymph nodes of neck region, 210 (27.09%) thyroid lesion, 182 (24.2%) salivary lesion, 84 (11.1%) soft tissue (Table-1). In the study of lymphnodes 98 (35.5%) tuberculosislymphadenitis, 55 (19.9%) reactive lymphadenitis, 44 (15.9%) suppurative lymph nodes, 79 (28.9%) lymphomas and metastasis (Table-2). In the study of thyroid lesions – 68 (32.3%) Benign nodular goitre, 25 (11.9%) follicular lesion, 72 (34.2%) Hashimoto thyroiditis, 45 (21.4%) malignant, (Table-3). In the study of lesions in salivary gland – 88 (48.3%) Pleomorphic adenoma, 35 (19.2%) muco-epidermoid carcinoma, 59 (32.4%)

chronic sialadentitiis (Table-4). In the lesions of soft tissue – 52 (61.9%) Lipoma, 26 (30.9%) vascular & other spindle cell lesion , 6 (7.14%) Basal cell carcinoma (Table-5) These findings are more or less agreement with previous studies[5][6][7].

Fine needle aspiration cytology has gained importance as it is inexpensive safe, quick and offers high degree of accuracy, reliability and feasibility when performed by a well trained and experienced cytologist. In present study, the array of lesion observed from various sites in head and neck region as effective diagnostic its utility as effective diagnostic modalities. However there are limitationsand pit-falls in cytological interpretations and those cases were confirmed by histological evaluation. It was also noted that, males were more affected than female in every study of head and neck region [8][9]. In the present study lymph-nodes of neck were highest 276 (36.7%) followed by 210 (27.9%) in thyroid lesion and least were observed 84 (11.1%) in soft tissue lesion similar observation was also done in previous authors [10][11].

Metastasis (malignant) lesion were more in thyroid lesion 45 (21.4%) followed in 35 (19.2%) in salivary gland and least 5 (7.14%) in soft tissue but metastatic lesion were more i.e. 79 (28.6%) in head neck region similar observations were also done in previous studies [12].

In the present study there was no bleeding, oedema, haematoma, or infection after the FNAC and helps pre-operative diagnosis of lesions clinical follow up more comfort to the patient and low risk of infection or tissue damage.

Summary and Conclusion

Present study of FNAC in lymph-nodes of Head and Neck lesion proved that FNAC is the ideal investigation one can claim with fairly good accuracy safe and quick which can be achieved with greater experience and expertise but early approach to medical aid like FNAC technique can prevent morbidity and mortality of the patient hence it requires to create awareness by medico-social workers or para-medical staff to educate the people having enlargement of lymph node or thyroid to access the medical aid at the earliest.

Limitation of Study – Due to tertiary location of research centre, small number of patients and lack of latest techniques we have limited findings and results.

- This research paper was approved by Ethical committee hospital Bairagarh Bhopal Madhya Pradesh – 462030
- No Conflict of Interest
- No Funding

References

1. De May RM – The art and science of cyto pathology vol. II Aspiration cytology. Chicago IL ASCP press 1996, page-703-78.

2. Bibbo M – comprehensive cyto-pathology 2nd edition Philadelphia PA; WB Saunders company 1997, page 673.

3. Rathod CB, Parmar P – Fine needle aspiration cytology of swelling of head an neck region Ind. J. Med. Science 2012, 66; 45-54.

4. Ishar T, Gupta RK, Khajuria A –Role of FNAC in diagnosis of non-thyroidal Head and Neck lesion J K science 2012, 14; 9-13.

5. AkhawanMoghadom J – A Fine Needle aspiration an a traumatic method to diagnose head and neck masses Trauma Man 2013, 18 (3); 117-21.

6. Chauhan S, Darad D – Fine needle aspiration cytology of neck lesion an experience at tertiary care hospital in central care Gujarat National J. of Medical research 2012, 2; 255-259.

7. Fernandes H , Souza CRS , Tejashwini BN – Role of find aspiration cytology in palpable Head and neck masses JCDR 2009, 3; 1719-1725

8. Jasani JH, Vaishnavi HV – Retrospective study of fine needle aspiration cytology of head and neck lesion in tertiary care hospital IJBAR 2013, 4; 253-257.

9. Jereh JA, Kelley GD – Tuberculosis mortality in United states Final data MMWR CDC surveill sur. 1990, 40 (553); 23.

10. Tarique Ahmed,MohdNaaniasiddique Ahmed –FNAC and neck swelling in surgical outpatient J. Ayub Med. College Abdottabad 2008, 20 (3); 30-32.

11. Afridi S, MAllick K – Role of Fine needle aspiration biopsy and cytology in breast lumps J. Coll. Physicians surgery Pak. 1995, 5; 75-7.

12. Shah Y, Savijan N – Retrospective study of Fine needle aspiration cytology of Head and Neck region in tertiary care hospital IJBAR 2013, 4; 253-57.

Good Maternal IFA Adherence with Poor Perceptions on Nutritional Iron Supplementation among a Cohort of Anemic South Indian Pregnant Women: The Effect of Nutrition Education on Hb Levels

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Abstract

Background: Inadequate dietary intake of iron is the most common cause of anemia among Indian pregnant women. Increasing awareness of nutritional iron supplementation helps to reduce the impact of anemia in pregnancy.

Objective: The objective of the study was to evaluate the effect of nutrition education on nutritional knowledge, attitude, practices, compliance to Iron-folate therapy, and hemoglobin levels among anemic pregnant women.

Methods: This intervention study was conducted from December 2020 to March 2021 in a secondary care level women and child hospital at Puducherry, India. The intervention group (n=59) and control group (n=58) included mild to moderately anemic pregnant women attending antenatal clinics. Nutrition education intervention and SMS alerts for four weeks were given to the mothers. Baseline data and hemoglobin levels were measured at the time of enrolment. Maternal compliance to iron-folate tablets (IFA) was assessed using a five-item Medical Adherence Rating Scale (MARS-5). End line data were collected after 4 weeks of nutrition education intervention.

Results: At the end of the nutrition education intervention, there was a significant improvement in the hemoglobin level in the intervention group compared to the control group (P<0.02). The change in the knowledge, attitude and practice scores regarding nutritional management of anemia and maternal compliance to iron-folate therapy were significantly high in the intervention group over the control group (P<0.001).

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Conclusion: Individual nutrition education was significantly associated with improved nutritional knowledge, attitude, practice scores, and compliance to IFA tablets. Further, it had a positive impact on the hemoglobin levels in anemic pregnant women.

Keywords: Anemia; nutrition education; nutritional management; hemoglobin

Introduction

Anemia is a major public health problem among Indian pregnant women. It is defined as a hemoglobin concentration less than 11 g/dl.[1] It could lead to adverse maternal and fetal outcomes such as intrauterine growth restriction, low birth weight, maternal and fetal mortality.[2]

World Health Organization (WHO) has estimated that the prevalence of anemia in pregnant women is 38.2% worldwide.[3] The prevalence of anemia among Indian pregnant women is 50.3%.[4] National Family Health Surveys (NFHS) from pregnant women aged 15–49 years showed that prevalence of anemia had significantly increased in the various States of India. [5,6]

Iron deficiency is the most common cause of anemia among Indian pregnant women.[7] Thus, the government of India under the National Iron Plus Initiative (NIPI), provides a daily dose of iron and folic acid tablet (IFA) of 100 mg of iron with 0.5 mg of folic acid to all pregnant women for 100 days.[8] However, the prevalence of anemia in pregnant women has not come down significantly.

Further, possible explanations for this continuing burden of anemia, are attributed to dietary and environmental reasons. The dietary reasons include the low bioavailability of iron in the dietary sources, poor selection or consumption of iron-rich foods, and increased intake of phytate rich foods. [9,10]

Knowledge about appropriate nutrition during pregnancy is important for the well-being of both mother and fetus.[11] Nutrition education is the most used strategy to improve the nutritional status of pregnant women.[12,13] Studies reported that Indian pregnant women had inadequate knowledge regarding the nutritional management of anemia. [2,14] Hence, regular nutrition education on the management of anemia during their antenatal visits would help to reduce the impact of anemia. The study aimed to evaluate the effect of nutrition education on nutritional knowledge, attitude, practices, compliance to iron-folate therapy, and hemoglobin levels among anemic South Indian pregnant women.

Materials and methods

Ethics

Ethical approval was obtained from the Institutional Ethics Committee (Human studies). Written informed consent was obtained from the anemic pregnant women included in the study. Confidentiality and privacy of the participants were maintained.

Study design and participants

This intervention study involving pregnant mothers attending the antenatal clinic with mild and moderate anemia. The study was conducted from December 2020 to March 2021 with one intervention and one control group in a secondary care level Women and Child hospital at Puducherry, India. Pregnant women aged 18 years or above, between 24 – 28 weeks of gestation, mild to moderately anemic (Mild anemia - Hb levels between 7.0 and 9.9 g/dL, Moderate anemia - Hb levels between 10.0 and 10.9 g/dL) [1] were included in the study. Pregnant women with medical conditions like diabetes mellitus, hypertension, thyroid disease, renal disease, cardiopulmonary disease, and severe anemia were excluded from the study.

Sample size and sampling method

We enrolled a total of 60 anemic pregnant women in both the intervention and control groups. Based on a previous study, the prevalence of anemia among antenatal mothers at Puducherry as 26%.[15] The sample size was adequate at 95% confidence interval, 80% power, alpha value of 0.05 calculated using OpenEpi online software** version 3.2 while also accounting up to 10% attrition. Consecutive numbering was given to all selected study subjects. The odd-numbered study subjects were assigned to receive nutrition education in the intervention

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group in addition to the routine hospital care and even-numbered study subjects received only routine hospital care in the control group.

Intervention

The intervention consisted of video-assisted nutrition education and leaflet distribution to the intervention group in addition to the routine hospital care and only routine hospital care to the control group during the study period. Nutrition education materials were prepared in Tamil (local language) by the Principal Investigator. It was developed based on the manual of "Dietary Guidelines for Indians" published by the Indian Council of Medical Research[16] and Information Education Communication materials (Anemia Mukt Bharat Programme) published by the Ministry of Health and Family Welfare, India.[17] The information in the nutrition education materials consisted of causes of anemia, signs, and symptoms, effects on mother and her fetus, iron-rich food items (affordable and locally available), enhancers and inhibitors of iron absorption, iron-rich food-based diet plan, and intake of recommended IFA tablets.

Study tools

Pretested semi-structured questionnaires, checklist, and Likert scale were used to collect data about demographic and obstetrical variables, maternal nutritional knowledge, practice, and attitude respectively. The maternal nutritional knowledge questionnaire consisted of 30 questions, for each correct answer a score of 1 was given while the incorrect answer was given a score of 0. Scores from 0 to 10, 11 to 20, and 21 to 30 were considered as poor, average, and good knowledge respectively. A 5-point Likert scale was used to assess the maternal attitude regarding nutritional management of anemia in pregnancy. It consisted of 10 statements with an overall score range between 10 and 50. Items were respectively scored from 1 – Strongly disagree, 2 - Disagree, 3 - Neutral, 4 - Agree, and 5 – Strongly agree. Scores from 34 to 50, 17 to 33, and 17 to 10 were considered as positive, neutral, and negative attitudes respectively. Maternal practices regarding nutritional management of anemia were assessed by a checklist of 15 questions. Each good practice has 1 mark and poor practice has 0 marks. Scores from 0

to 5, 6 to 10, and 11 to 15 were considered as poor, average, and good practice respectively.

Consumption of IFA tablets at least 5 days a week by anemic pregnant women was considered as compliant. [18,19] Also maternal compliance to iron-folate therapy was assessed using a five-item Medical Adherence Rating Scale (MARS-5). All items of MARS-5 answered on a 5-point Likert scale (from never to always) with the overall score range between 5 and 25. Participants with lower scores were considered to have low compliance to IFA tablets.[20]

Study procedure:

The study was conducted in three phases.

Phase 1

This phase included the collection of baseline data about demographic and obstetrical variables and hemoglobin values of the anemic pregnant mothers. The pre-test was conducted in both groups to assess the knowledge, attitude, practice regarding nutritional management of anemia and compliance to iron-folate therapy.

Phase 2

In this phase, a video-assisted nutrition education session was held after the pre-test lasting approximately 30 minutes followed by the leaflet distribution in the intervention group in addition to the routine hospital care. Further, an SMS alert was sent twice a day for four weeks as reinforcement of regular intake of iron-rich foods and IFA tablets in the intervention group. Routine hospital care only was given to the pregnant mothers in the control group.

Phase 3

Final assessment of outcome in intervention and control group were carried out after four weeks of nutrition education. Maternal nutritional knowledge, attitude, practice, IFAS compliance, and hemoglobin values were measured in both intervention and control groups.

Statistical analysis

All statistical analyses were done using Statistical Package of Social Sciences (SPSS) version 19.0

software for Windows. A Chi-square test was used to compare the baselines characteristics between the intervention and control groups. Baseline differences and post-intervention differences in the intervention and control groups for maternal nutritional knowledge, attitude, practice, IFAS compliance, and hemoglobin values were compared by using Unpaired *t*-test. A value of $P \leq 0.05$ was considered statistically significant.

Results

In the present study, 59 pregnant women received video-assisted nutrition education as well as SMS alert for reinforcement of regular intake of iron-rich foods and IFA tablets in addition to the routine hospital care, while 58 pregnant women received routine hospital care only. Three participants could not be followed up during the study. There was no significant difference between the intervention and control groups regarding age, educational level, income level, pre-pregnancy body weight, and gravidity.

The majority of pregnant women in the control group 52 (89.7%) and the intervention group 49 (83%) had mild anemia at baseline. 21 (35.6%) of pregnant women in the intervention group and 06 (10.3%) in the control group had a normal level of hemoglobin after four weeks of intervention. There was a significant improvement in the hemoglobin level of anemic pregnant women in the intervention group compared to the control group at the end line (Table 1).

Before the intervention, only 09 (15.5%) of mothers in the control group and 08 (13.6%) of mothers in the intervention group had good nutritional knowledge scores (knowledge score >20). After the intervention, 32 (54.2%) of mothers in the intervention group had a good nutritional knowledge score compared to 15 (25.8%) of mothers in the control group. 08 (13.7%) of mothers in the control group and 09 (15.3%) of mothers in the intervention group had good maternal practice scores at the baseline (practice score >10). After the intervention, 35 (59.3%) of mothers in the intervention group had a good practice score compared to 10 (17.2%) of mothers in the control group. There was a significant difference in the knowledge, attitude, and practice scores regarding nutritional management of anemia in the intervention group compared to the control group at the end line (Table 2).

This study found that a majority of pregnant women in both intervention and control groups had good compliance to IFA tablets at baseline (51 (86.4%) and 48 (82.7%) respectively). After the intervention, 56 (94.9%) of mothers in the intervention group had good compliance compared to 51 (87.9%) of mothers in the control group. There was a significant difference in the MARS -5 score in the intervention group compared to the control group at the end line (Table 2).

Table 1. Comparison of the baseline and end line Hb level in control and intervention group

Variable	Control Group (n=58)	Intervention Group (n=59)	P-value
	Mean ± SD	Mean ± SD	
Hemoglobin (g/dl)			
Baseline	9.46 ± 0.74	9.63 ± 0.51	0.218
End line	9.58 ± 0.62	10.12 ± 0.49	0.021*

*P<0.05 is considered statistically significant. Unpaired *t*-test. SD: Standard deviation

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Table 2. Comparison of the post intervention scores of maternal knowledge, attitude, practice and maternal compliance to iron folate supplementation in control and intervention group

Variable	Control Group (n=58)	Intervention Group (n=59)	P-value
	Mean ± SD	Mean ± SD	
Knowledge score	11.97 ± 2.04	22.23 ± 4.45	< 0.001*
Attitude score	37.42 ± 5.82	44.83 ± 3.49	< 0.001*
Practice score	7.64 ± 1.82	11.45 ± 2.63	< 0.001*
MARS-5 score	21.54 ± 2.76	23.15 ± 1.60	< 0.001*

*$P<0.05$ is considered statistically significant. Unpaired t-test. SD: Standard deviation.

Discussion

Anemia prevalence in pregnant women of India is stagnant in the past decade despite the improvement in the uptake of iron-folate (IFA) tablets for 100 days of pregnancy.[5,6] Besides compliance with IFA tablets, nutritional factors should be considered in the prevention or management of anemia during pregnancy.[9,10] The results of the present study showed that pregnant women who received nutrition education had a significant improvement in knowledge, attitude, practice, compliance to iron-folate therapy, and hemoglobin levels.

At the end-line, there was a significant improvement in the hemoglobin levels of the intervention group compared to the control group (Table 1). Study reported that individual counseling was found to improve hemoglobin levels.[21] Studies reported that nutrition education regarding iron-rich food consumption was significantly improved the hemoglobin levels among Nepalese and Ghana anemic pregnant women.[12,22] Further, nutrition education on nutritional iron supplementation was positively associated with improved hemoglobin levels in pregnant women.[22] Individual education through an anemia pictorial handbook and counseling had shown improvement in hemoglobin and hematocrit levels among Indonesian anemic pregnant women.[13] A quasi-experimental study showed a positive relationship between dietary practices and improvement of hemoglobin levels of pregnant women.[23]

Studies reported that Indian pregnant women were unaware about iron-rich food items and food items that promote iron absorption can improve the anemia status.[14] The present study showed that the nutrition education was significantly associated with an increase in maternal nutritional knowledge, attitude, and practice in the intervention group compared to the control group (Table 2). A similar study conducted on Nepalese pregnant women exhibited an improved knowledge score after the nutrition education and iron-rich food-based diet plan.[12] Further, integrated pictorial handbook education and counseling had significantly improved the knowledge score on Indonesian pregnant women at the end of the intervention period.[13] A study reported that nutrition education and specific dietary practices were significantly increased the knowledge of pregnant women on nutrition during pregnancy [24]

The findings of the present study suggest pregnant women who attain good nutritional knowledge and practices can improve their hemoglobin levels. Thus, nutrition education during antenatal visits could improve maternal nutritional knowledge and dietary practices regarding the selection and consumption of iron-rich foods and avoidance of foods that have inhibitors of iron absorption. It could help to prevent and manage anemia during pregnancy. Similarly, an interventional study reported that nutrition education sessions were found helpful to prevent anemia by improving the nutritional knowledge score in pregnant women.[25]

The NFHS-4 reported that only 30.3% of pregnant Indian women took IFAS for ≥100 days.[5] However, compliance with IFA tablets is still low in pregnant women in India. The present study found that a majority of pregnant women in both intervention and control groups had good compliance to IFA tablets at baseline. In addition to nutrition education, we sent

an SMS alert twice a day for four weeks period in the intervention group to the reinforcement of regular intake of iron-rich foods and IFA tablets. We found significant improvement in the compliance to IFA tablets at the end line. Similar results were reported by other studies conducted with the nutrition education session, individual counselling, and anemic pictorial handbook education. [12,13]

The present study has some limitations. The compliance with nutrition education was not assessed in this study. No data were collected on the frequency of iron-rich food intake during the intervention period. Markers of anemic status such as serum ferritin, serum iron, and transferrin saturation were not measured. A self-reported questionnaire was used to assess maternal compliance with IFA tablets.

Conclusion

Provision of individual nutrition education through video and leaflets was significantly associated with improved nutritional knowledge, attitude, practice scores, and compliance to IFA tablets. Further, it had a positive impact on the hemoglobin levels in anemic pregnant women. We also recommend that further studies assess the effect of nutrition education from the first trimester of pregnancy and compare it with the pregnancy outcomes.

Conflicts of interest: There are no conflicts of interest.

References

1. WHO | Haemoglobin concentrations for the diagnosis of anaemia and assessment of severity [Internet]. WHO. World Health Organization; [cited 2021 Apr 25]. Available from: http://www.who.int/vmnis/indicators/haemoglobin/en/

2. Tandon R, Jain A, Malhotra P. Management of Iron Deficiency Anemia in Pregnancy in India. Indian J Hematol Blood Transfus. 2018 Apr;34(2):204–15.

3. WHO | Global anaemia prevalence and number of individuals affected [Internet]. WHO. World Health Organization; [cited 2021 Apr 25]. Available from: https://www.who.int/vmnis/anaemia/prevalence/summary/anaemia_data_status_t2/en/

4. Kalaivani K, Ramachandran P. Time trends in prevalence of anaemia in pregnancy. Indian J Med Res. 2018 Mar;147(3):268–77.

5. International Institute of Population Sciences. India Fact Sheet National Family Health Survey-4 2015-206. Mumbai: IIPS; 2017. Available from: http://www.rchiips.org/NFHS/pdf/ NFHS4/%0AIndia.pdf

6. International Institute of Population Sciences. India Fact Sheet National Family Health Survey-4 2015-206. Mumbai: IIPS; 2017. Available from: http://www.rchiips.org/NFHS/pdf/ /NFHS-5_FCTS/ NFHS-5%20State%20Factsheet% 20Compendium_Phase-I.pdf

7. Rai RK, Fawzi WW, Barik A, Chowdhury A. The burden of iron-deficiency anaemia among women in India: how have iron and folic acid interventions fared? WHO South-East Asia J Public Health. 2018 Jan 1;7(1):18.

8. Kapil U, Bhadoria AS. National Iron-plus initiative guidelines for control of iron deficiency anaemia in India, 2013. Natl Med J India. 2014 Feb;27(1):27–9.

9. Samuel TM, Thomas T, Finkelstein J, Bosch R, Rajendran R, Virtanen SM, et al. Correlates of anaemia in pregnant urban South Indian women: a possible role of dietary intake of nutrients that inhibit iron absorption. Public Health Nutr. 2013 Feb;16(2):316–24.

10. Varghese JS, Swaminathan S, Kurpad AV, Thomas T. Demand and supply factors of iron-folic acid supplementation and its association with anaemia in North Indian pregnant women. PLOS ONE. 2019 Jan 30;14(1):e0210634.

11. Paknahad Z, Fallah A, Moravejolahkami AR. Maternal Dietary Patterns and Their Association with Pregnancy Outcomes. Clin Nutr Res. 2019 Jan 25;8(1):64–73.

12. Sunuwar DR, Sangroula RK, Shakya NS, Yadav R, Chaudhary NK, Pradhan PMS. Effect of nutrition education on hemoglobin level in pregnant women: A quasi-experimental study. PLoS ONE. 2019 Mar 21;14(3):e0213982.

13. Nahrisah P, Somrongthong R, Viriyautsahakul N, Viwattanakulvanid P, Plianbangchang S. Effect of Integrated Pictorial Handbook Education and Counseling on Improving Anemia Status, Knowledge, Food Intake, and Iron Tablet Compliance Among Anemic Pregnant Women in Indonesia: A Quasi-Experimental Study. J Multidiscip Healthc. 2020;13:43–52.

Rajeswari Ramachandran, Manjubala Dash, Felicia Chitra A. Good Maternal IFA Adherence with
Poor Perceptions on Nutritional Iron Supplementation among a Cohort of
Anemic South Indian Pregnant Women: The Effect of Nutrition Education on Hb Levels

256

14. Kulkarni KK. KAP Studies Among Indian Antenatal Women: Can We Reduce the Incidence of Anemia? J Obstet Gynaecol India. 2015 Oct;65(5):320–2.

15. International Institute of Population Sciences. National Family Health Survey-4. 2015-2016 State Fact Sheet Puducherry. Mumbai: IIPS; 2017. Available from: http://rchiips.org/nfhs/pdf/NFHS4/PY_FactSheet. pdf.

16. National Institute of Nutrition. Dietary Guidelines for Indians Manual- A Manual. India: National Institute of Nutrition, ICMR; 2011. Available from: http://www. ninindia.org/DietaryGuidelinesforNINwebsite. pdf.

17. Anemia Mukt Bharat — Vikaspedia. Available from: http://vikaspedia.in/health/health-campaigns/ anemia-muktbharat.

18. Chakma T, Vinay Rao P, Meshram PK. Factors associated with high compliance/feasibility during iron and folic acid supplementation in a tribal area of Madhya Pradesh, India. Public Health Nutr. 2013 Feb;16(2):377–80.

19. Kamau MW, Mirie W, Kimani S. Compliance with Iron and folic acid supplementation (IFAS) and associated factors among pregnant women: results from a cross-sectional study in Kiambu County, Kenya. BMC Public Health. 2018 May 2;18(1):580.

20. Chan AHY, Horne R, Hankins M, Chisari C. The Medication Adherence Report Scale: A measurement tool for eliciting patients' reports of nonadherence. Br J Clin Pharmacol. 2020 Jul;86(7):1281–8.

21. Garg A, Kashyap S. Effect of counseling on nutritional status during pregnancy. Indian J Pediatr. 2006 Aug;73(8):687–92.

22. Otoo G, Adam Y. Effect of Nutrition Education with an Emphasis on Consumption of Iron-Rich Foods on Hemoglobin levels of Pregnant Women in Ghana. FASEB J. 2016;30(S1):410.2-410.2.

23. Al-Tell M, El-Guidi F, Soliman N. Effect of nutritional intervention on anemic pregnant women's health using health promotion model. Med J Cairo Univ. 2010 Mar 1;78:109–18.

24. Teweldemedhin LG, Amanuel HG, Berhe SA, Gebreyohans G, Tsige Z, Habte E. Effect of nutrition education by health professionals on pregnancy-specific nutrition knowledge and healthy dietary practice among pregnant women in Asmara, Eritrea: a quasi-experimental study. BMJ Nutr Prev Health [Internet]. 2021 Jun 1 [cited 2021 Sep 3];4(1). Available from: https://nutrition.bmj.com/content/4/1/181

25. Nimbalkar PB, Patel JN, Thakor N, Patni M. Impact of educational intervention regarding anaemia and its preventive measures among pregnant women: an interventional study. Int J Reprod Contracept Obstet Gynecol. 2017 Nov 23;6(12):5317–21.

Thyroid Hormone Profile in Chronic Kidney Disease Patients Handled Conservatively or by Haemodialysis

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Abstract

Background: There is an interdependency between thyroid hormones and renal function. Chronic Kidney Disease (CKD) is a degradation of renal function that is irreversible.

Aimsand Objectives: To compare the thyroid hormone profiles of CKD patients receiving two distinct therapeutic approaches.

Materials and methods: Over the course of one year, 200 newly diagnosed or known patients withCKD were recruited for a cross-sectional study. Group 1 consisted of 100 CKD patients treated conservatively, whereas Group 2 consisted of 100 CKD patients on haemodialysis. Fasting Blood Glucose (FBG), Serum urea (S. Urea), Serum Creatinine (S. Creatinine), and a thyroid hormone profile were all measured. Estimated Glomerular Filtration Rate (eGFR) was calculated using the Cockcroft-Gault formula.

Results: The mean age of patients in Group 1 was 51.04 years and in Group 2 it was 53.20 years. S. Creatinine, S. Urea, and eGFR values changed significantly between the two treatment groups. In 36% of instances, a thyroid malfunction was present. Only FT4 differed significantly across the two groups (p = 0.026)**Conclusion:**Low levels of the thyroid hormones FT3, FT4, TT3, and TT4 were detected in all CKD cases. However, no significant differences in thyroid status were found between haemodialysis patients and non-dialysis patients.

Keywords: Chronic Kidney Disease, Conservative Management, Haemodialysis, Thyroid Hormones

Introduction

Importantly, kidneys perform other homeostatic tasks in addition to their excretory role. Therefore, it is more accurate to refer to kidneys as regulatory organs than excretory organs. The kidneys regulate osmolality and volume of body fluids, electrolyte balance, acid-base balance, hormone production and secretion, and the elimination of metabolic waste and foreign substances.

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The Kidney exemplifies, to the greatest extent, the phenomena of sensitivity, the capacity to respond to a variety of stimuli in a manner conducive to the survival of the organism, and a capacity for adaptation that nearly gives the impression that its components are endowed with intelligence.

Triiodothyronine (T3) and thyroxine (T4) are necessary for controlling metabolism, growth, and protein synthesis. In addition, these hormones can have an important impact on kidney disease. T4 is only produced by the thyroid gland. Moreover, the majority of T3 and reverse T3 (rT3) are generated by the peripheral enzymatic deiodination of T4 in the liver, kidney, skeletal muscle, heart, and brain. Kidneys are necessary for thyroid hormone metabolism, breakdown, and elimination. In patients with severe kidney illness, thyroid dysfunction takes on certain characteristics.[1]

A fascinating subject is how thyroid hormone levels influence the course of chronic renal disease. Various abnormalities in thyroid hormone levels and metabolism have been described in people with this condition.[2,3]

In recent years, a worldwide increase in chronic kidney disease (CKD) has placed a significant burden on the healthcare system in this region of the world. Concerns also surround thyroid dysfunction in CKD. Keeping in mind the lack of information in this area, the present study was done to examine thyroid dysfunction in patients with CKD. The thyroid dysfunction of CKD patients undergoing conservative treatment (CM) versus haemodialysis (HM) was evaluated to identify any differences.

Aims and Objectives

To evaluate the pattern of Thyroid profile, i.e., serum-free Triiodothyronine (FT3), free Thyroxine (FT4), total T3 (TT3), total T4 (TT4), and Thyroid stimulating hormone (TSH), in CKD patients treated with a conservative approach and haemodialysis.

Materials and Methods

Study design:

Cross-sectional research

Study settings:

A hospital-based study involving 200 males and females with newly diagnosed or known cases of CKD, regardless of disease duration, was conducted at a teaching hospital in Northern India. The purpose and protocol of the study were outlined, and all participants gave their written informed consent. Each patient received a thorough medical history and physical examination.

Study Participants: The study participants were selected as follows:

Inclusion Criteria:

1. Age restrictions between 20 and 80 years of age

2. More than or equal to 1.4 mg/dL of serum creatinine.

3. Estimated creatinine clearance below 60 ml/min (using Cockcroft-Gault formula)[4]

Exclusion criteria:

1. Diagnosed hypothyroidism and hyperthyroidism cases

2. Post renal transplant patients

3. People taking drugs capable of altering the Thyroid profile

4. Pregnant woman.

5. Individuals who rejected to participate in the study

Two groupings of cases were created.

Group 1 consists of 100 patients managed conservatively for CKD (CM)

100 haemodialysis cases comprise Group 2 (HM)

Laboratory Analysis:

Each patient donated 5 mL of venous blood for biochemical analysis.

1. Serum urea

2. Concentration of Creatinine in Serum

3. The clearance of creatinine and

4. Serum FT3, FT4, TT3, TT4, and TSH

Statistical analysis:

All study-generated data were entered into MS Excel 2019 version. SPSS 22.0 was used to conduct the statistical analysis. Using the unpaired Student's t-test, we compared the normally distributed study group data. The Mann-Whitney U and Wilcoxon W tests were used to examine non-normally distributed data. Less than 0.05 was considered statistically significant.

The study comprised 200 cases of CKD, 129 of which were male and 71 of which were female. The ages of our volunteers ranged from 21 to 79 years old. The mean age of patients getting conservative therapy was 51.04 years, while those receiving haemodialysis were 53.20 years old on average. In Group 1, the ratio of males to females was 66 to 34, while in Group 2 it was 63 to 37. The data from the study are reported in Tables 1 to 3 below.

Results

Table 1: Baseline biochemical parameters for Patients in Group 1 and Group 2

Parameter	Group 1 (N=100) Mean ±SD	Group 2 (N=100) Mean± SD	p-value
S.Creatinine(mg/dl)	2.79± 0.70	7.66± 3.25	0.000*
S.Urea (mg/dl)	85.86± 10.90	131.91± 25.97	0.000*
eGFR (ml/min)	26.75± 8.54	9.93± 3.23	0.000*

Table 2: Thyroid status in CKD cases

Thyroidstatus	Number of patients (percentage of total)
a) Euthyroid	128 (64%)
b) Euthyroidsicksyndrome	56 (28%)
c) Subclinicalhypothyroidism	16 (8%)
Total	200 (100 %)

Table 3: Comparison of Thyroid Profile of CKD Patients Based on Treatment Modality

Parameters	Group1 (N=100)		Group2 (N=100)		p-value
	Mean±SD	Rank	Mean±SD	Rank	
FT3 (pg/ml)	2.25±0.50	104.23	2.17±0.67	96.78	0.36
FT4(ng/dl)	1.10±0.18	91.4	1.05±0.15	109.61	0.02*
TT3(ng/ml)	0.94±0.28	96.84	0.93±0.23	104.16	0.37
TT4 (μg/dl)	6.99±2.07	102.07	6.98±1.67	98.94	0.70
TSH(μIU/ml)	2.19±1.35	97.08	2.62±2.24	103.92	0.40

*statisticallysignificant

Group 1 and Group 2 patients receiving conservative and hemodialysis therapies; mean/rank of various thyroid hormones. Group 1 had an FT3 concentration of 2.25 pg/ml, while Group 2 had a value of 2.17 pg/ml. In Group 1, the FT4 concentration was 1.10 ng/dl, but in Group 2, it was 1.05 ng/dl. Group 1 had a TT3 value of 0.94 ng/ml, while Group 2 had a concentration of 0.93 ng/ml. In Group 1,

the concentration of TT4 was 6.99 μg/dl, while in Group 2 it was 6.98 μg/dl. In Group 1, TSH levels were 2.19 μIU/ml, whereas they were 2.62 μIU/ml in Group 2. Consequently, FT3, FT4, TT3, and TT4 were lower, although TSH was higher in the hemodialysis patient, indicating that haemodialysis affected the thyroid profile. In contrast, only FT4 demonstrated statistically significant variations between the two groups (p = 0.026).

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Discussion

CKD is defined as abnormalities of kidney structure with signs of kidney damage or function and a GFR of less than 60 ml/min per 1.73 m^2 that have been present for at least three months and have health consequences. End-stage renal disease (ESRD) is the final stage of chronic renal disease (stage 5) characterized by a GFR of less than 15 ml/min/1.73 m^2. 5-10% of the global population is affected by CKD, making it a worldwide public health concern. Recent reports of a rise in the prevalence of chronic kidney disease (CKD) in developing Asian nations have been linked to a rise in concomitant diseases such as type 2 diabetes, hypertension, and cardiovascular disease (CVDs).[5] KDIGO's (2012) Clinical Practice Guideline for the Evaluation and Management of Chronic Kidney Disease includes the following treatment options: Renal Replacement Therapy, comprising peritoneal dialysis, hemodialysis, and kidney transplantation. Patients in the first stages of CKD or ESRD who prefer not to undergo RRT have the option of conservative therapy. Candidates seeking a kidney transplant must undergo dialysis until a suitable donor kidney is obtained.[6] Thyroid dysfunction is an additional symptom of CKD.

The average age of our study population was similar to that of Avasthi G et al.[7] According to these findings, elderly patients are more susceptible to CKD. Age is connected with a fivefold increase in the probability of passing away within 90 days of beginning dialysis.[8]

There were 129 male patients (64.5% of the study population) and 71 female patients (35.5%), giving a male-to-female ratio of 1.80:1. Compared to the study by Hossain M et al., the ratio of males to females was greater. [9] Among both trials, male participants outnumbered females, demonstrating that CKD is significantly more common in men.

In our investigation, the majority of CKD cases (64%), followed by euthyroid sick syndrome (28%) and subclinical hypothyroidism (8%), demonstrated euthyroidism. A Nepalese study of haemodialysis patients revealed a frequency of subclinical and clinical hypothyroidism of 26.6 percent. [10]

According to Lo JC, when GFR drops, the frequency of subclinical hypothyroidism continuously rises.[11] Quion Verde H et al. found a significant prevalence (5%) of hypothyroidism among persons with end-stage renal failure. [12]

No hypothyroidism or hyperthyroidism symptoms were detected in the participants of this investigation. On occasion, certain patients experienced overlapping physical symptoms of CKD and hypothyroidism, such as facial puffiness and pedal oedema. No patient was identified as having thyromegaly. Contrary to the findings of Silverberg DS et al. and Lim VS et al.[13,14], the absence of goitre in our investigation is consistent with that of Mehta HJ et al.[15]

Thyroid function in CKD is distinguished from primary hypothyroidism by low thyroid hormone levels and normal TSH levels. In primary hypothyroidism, elevated TSH levels accompany low thyroid hormone levels.

Comparing Group 1 and Group 2, low FT3 levels were seen in 19 instances of Group 1 and 37 cases of Group 2, indicating a progression of CKD stage. In three cases of Group 1 and four cases of Group 2, low FT4 was identified, and each case indicated progression with increasing CKD stage. Ten patients in Group 1 and seventeen cases in Group 2 were found to have low TT3 levels, and in both groups, the values dropped as the stage progressed. 8 instances of Group 1 and 12 cases of Group 2 were found to have low TT4 levels; the values for each case declined with the progression of the CKD stage. In contrast, seven instances in Group 1 displayed elevated TSH levels with varying average percentages of thyroid profile, compared to nine cases in Group 2; each case exhibited an increase in TSH levels as the disease progressed. The average values for additional issues were low in both study groups. Group 2 cases had lower FT3, FT4, TT3, and TT4 levels, whereas TSH levels were greater; however, only FT4 levels were statistically different (p=0.026).

Singh S reported low FT3 levels in 33.98% of CKD haemodialysis patients and low FT4 levels with normal TSH levels in 18.44% of cases.[16]

Similarly, Srivastava S et al. found significantly lower FT3 and free thyroxine FT4 (P <0.001 for each)

in undialyzed CKD patients, whereas TSH levels were unaltered in both patients and controls.[17]According to Zoccali et al., a decrease in FT3 in CKD patients is indicative of inflammation.[18]ESRD patients' increased TSH levels can be explained by the severity of their ailment. Joseph et al. show that when renal insufficiency develops, TSH levels rise.[19] The outcomes of this study demonstrate the importance of routine screening and treatment of thyroid dysfunction in CKD patients for improved clinical management and, subsequently, improved quality of life.

Recommendations:

1. Low FT3 levels have been demonstrated to be an independent predictor of mortality in haemodialysis patients; hence, its levels should be routinely evaluated as part of the haemodialysis panel in order to reduce morbidity and enhance the quality of life in CKD cases.

2. Low FT3 levels are associated with an increased risk of graft loss after transplantation; consequently, it is essential for nephrologists to monitor thyroid levels in patients prior to renal transplantation.

Conclusion

In cases of CKD, the thyroid hormones FT3, FT4, TT3, and TT4 were all at low levels despite a nearly normal TSH, and this condition worsens as CKD progresses. There was no significant difference in thyroid status between patients on dialysis and those not on dialysis.

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Conflict of Interest: Nil

Ethical Clearance: Received

References

1. Kaptein EM, Quion-Verde H, Chooljian CJ, Tang WW, Friedman PE, Rodriquez HJ, Massry SG. The thyroid in end-stage renal disease. Medicine (Baltimore).1988 May;67(3):187-97.

2. Gupta A, Kuldeep K, Virmani SK, Arora M. Thyroid dysfunction in patients of chronic kidney disease. Int J Adv Med. 2017;4:1333-1337.

3. Thomas R, Kanso A, Sedor JR. Chronic kidney disease and its complications. Prim Care. 2008;35:329-344.

4. Cockcroft DW, Gault MH. Prediction of creatinine clearance from serum creatinine. Nephron. 1976; 16(1): 31-41.

5. Tsukamoto Y, Wang H, Becker G, Chen HC, Han DS, Harris D, Imai E, Jha V, Li PK, Lee EJ. Matsuo S, Tomino Y, Tungasanga K, Yamagata K, Hishida A. Report of the Asian Forum of Chronic Kidney Disease Initiative (AFCKDI) 2007. "Current status and perspective of CKD in Asia": diversity and specificity among Asian countries. Clin Exp Nephrol. 2009 Jun;13(3):249–56.

6. Kidney Disease: Improving Global Outcomes (KDIGO) CKD Workgroup. KDIGO 2012 Clinical practice guidelines for the evaluation and management of chronic kidney disease. Kidney Inter Suppl. 2013;3:1-150.

7. Avasthi G, Malhotra S, Narang APS, Sengupta S. Study of thyroidfunctions in patients of chronic renal failure. Indian J Nephrol. 2001;11:165-69.

8. Soucie JM, McClellan WM. Early death in dialysis patients: risk factors and impact on incidence and mortality rates. J Am Soc Nephrol. 1996 Oct;7(10):2169-75.

9. HossainMM, Shah K, BegumN, Ahmed P, Islam AK, Chowdhury NI. Thyroid Functional Status in Chronic Kidney Disease. Bangladesh Jof Nucl Med 2015; 18(2):141–144.

10. Paudel K. Prevalence and Clinical Characteristics of hypothyroidism in a Population Undergoing Maintenance Haemodialysis. J Clin Diagn Res. 2014 Apr;8(4):MC01-MC04. Published online 2014 Apr 15.

11. Lo JC, Chertow GM, Go AS, Hsu CY. Increased prevalence of subclinical and clinical hypothyroidism in persons with chronic kidney disease. Kidney Int. 2005;67:1047–52.

12. Quionverde H, Kaptein EM, Rodriguez HJ, Massry S. Prevalence of thyroid -disease in chronic renal failure (CRF) and dialysis patients. In Kidney International 350 Main ST, Malden, MA 02148: Blackwell Science Inc.1984 Jan; 25(1): 190-190.

13. Silverberg DS, Ulan RA, Fawcett DM, Dossetor JB, Grace M,Bettcher K. Effects of chronic hemodialysis on thyroid function inchronicrenal failure.Can MedAssoc J.1973;109(4):282-86.

14. LimVS, ZavalaDC, FlaniganMJ, FreemanRM. Blunted peripheral tissue responsiveness to thyroidhormo neinuremic patients. KidneyInt 1987;31(3):808-14.

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15. Mehta HJ, Joseph LJ, Desai KB, Mehta MN, Samuel AM, Almeida AF, Acharya VN. Total and free thyroid hormone levels in chronic renal failure. J Postgrad Med.1991 Apr;37(2): 79-83.

16. Singh S, Verma A, Aryal G, Thapa S, Khakurel S, Shrestha K. Thyroid hormone profile in patients with chronic kidney disease: a single centre study. J Nepal Health Res Counc. 2016 Sep;14(34):197-201.

17. Srivastava S, Rajput J, Shrivastava M, Chandra R, Gupta M, Sharma R. Correlation of Thyroid Hormone Profile with Biochemical Markers of Renal Function in Patients with Undialyzed Chronic Kidney Disease. Indian J Endocrinol Metab. 2018 May-June;22(3):316-320.

18. Zoccali C, Tripepi G, Cutrupi S, Pizzini P, Mallamaci F. Low triiodothyronine: a new facet of inflammation in end-stage renal disease. J Am Soc Nephrol. 2005 Sep;16(9):2789-95.

19. Joseph LJ, Desai KB, Mehta HJ, Mehta MN, Almeida AF, Acharya VN, Samuel AM. Measurement of serum thyrotropin levels using sensitive immunoradiometric assays in patients with chronic renal failure: alterations suggesting an intact pituitary thyroid axis. Thyroidology. 1993 Aug;5(2):35-9.

Is there an Association between the ABO Blood type and Bleeding or Clotting Times?

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Abstract

Introduction: Evaluating blood type, bleeding time (BT), and clotting time (CT) are essential before surgery. Blood type reveals personality. Multiple studies link ABO blood types to digestive (GI) disorders, urinary tract infections (UTIs), cardiovascular diseases (CVD), diabetes, thrombosis, and epistaxis. BT and CT differ among blood types. This study investigated the relationship between blood types and BT and CT.

Aims and Objectives: To investigate the connection between BT and CT and Blood Groups in medical students and identify gender differences in these parameters.

Materials and Methods: This cross-sectional research was carried out between September 2021 and May 2022 on 250 healthy first-phase MBBS students (17–20 years old) of both sexes (batch 2020–2021 & 2021-22) at GMC Jammu's haematology laboratory. The blood group was determined using a standard antiserum Agglutination test—CT using Wright's Capillary tube technique and BT using Duke's filter paper technique. Based on the methodology above, we classify regular BT and CT as 2 to 6 minutes and 3 to 8 minutes, respectively. BT and CT levels were examined for each blood type. The blood group distribution was reported as a percentage, the relationship between BT or CT and blood groups was analysed using Chi-square analysis, and the gender differences between these parameters were analysed using an unpaired t-test in SPSS 26.0.

Results: In our investigation, the distribution of ABO blood groups was determined to be: 39.6% B > 34% O > 21.2% A > 5.2% AB. Chi-square analysis revealed a non-significant ABO blood group correlation with BT (p=0.938) and CT (p=0.652). Comparing blood types with BT and CT, the AB and B blood groups had higher mean BT and CT values among the study participants. The blood type influenced BT/CT. Screening and prevention must commence before the onset of bleeding disorders.

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Conclusion: The most prevalent blood group among medical students was B, whereas AB was the least prevalent. Blood types AB and B have greater levels of BT and CT. Neither BT nor CT were significantly associated with blood type. BT and CT values were found to be greater in females.

Keywords: Blood types, Bleeding Time, Clotting Time, Medical Students.

Introduction

Hemostasis is the production of blood clots in wounded artery walls to limit blood loss and preserve the fluid state of blood inside the vascular system. Coagulation and anticoagulation are maintained in equilibrium by complex, interdependent systemic mechanisms.[1]

The blood group is an important factor in transfusion medicine. In certain clinical scenarios, including epistaxis, surgery, and thrombosis, it is required to correlate blood type, bleeding time, and clotting time. Before surgical techniques to halt bleeding from injured blood vessels, hemostasis is a critical element that must be evaluated. Therefore, hospitals often do blood testing before surgical procedures.

The discovery of the ABO blood groups by Karl Landsteiner and the subsequent discovery of the Rh (D) antigen marked a crucial turning point in the history of blood transfusion.[2-3] Antigens of the ABO blood group system affect the hemostatic equilibrium. Patients with von Willebrand disease type I (VWD) have a higher prevalence of blood group O, which correlates with decreased VWF levels.[4-5] The link between non-O blood types and thrombosis risk is independent of the von Willebrand factor and factor VIII.[6]

International research efforts have focused on the relationship between diseases and blood types. Reddy VM et al. found that 50.44 per cent of Caucasian patients with epistaxis have blood group O, as opposed to 45.10 per cent of the control group. Individuals with blood group O are more susceptible to gastrointestinal disorders. Von Willebrand factor and factor VIII levels are greater in blood types A, B, and AB (non-O) than in blood type O.[7-8] Blood types A, B, and AB are more prone to arterial and venous thrombotic diseases. Consequently, the ABO blood group system influences a person's BT and CT. BT is the time between a skin puncture to the spontaneous, unassisted cessation of bleeding; it is used mostly to test platelet function. CT is the amount of time between blood entering a capillary glass tube and fibrin strand formation.[9] Interactions between BT, CT, and blood types influence clinical problems such as epistaxis, heart surgery, and thrombosis.

Given the paucity of research on the topic in the J&K Union Territory and the inconclusive results of a prior study conducted in India and overseas, this study was conducted to investigate the association between bleeding and clotting times and ABO blood types in young, healthy participants.

AIMS AND OBJECTIVES: To investigate the connection between BT and CT and Blood Groups in medical students and identify gender differences in these parameters.

Materials and Methods

Study design:

This investigation is cross-sectional.

Study settings:

This research was performed between September 2021 and May 2022 on 250 healthy first-year MBBS students (academic years 2020-21 and 2021-22) in the Department of Physiology haematology lab at GMC Jammu, with IEC permission and informed consent.

Study subjects:

The study subjects were selected as follows:

Inclusion Criteria:

The following criteria were used in this study:

- The age range for first-year medical students was between 17 and 20.
- Males and females comprise an equal number of medical subjects.

Exclusion Criteria:

To avoid bias, subjects with bleeding/clotting time issues, Nonsteroidal anti-inflammatory drugs

(NSAIDs), antiplatelets, or anticoagulants, and smokers were excluded from this study.

Laboratory Analysis:

A finger prick was used to draw blood samples under sterile settings. Blood and normal saline were combined to form the suspension of red blood cells. On glass slides, the red blood cell suspension was mixed with anti-A, anti-B, and anti-D antibodies (commercially available monoclonal antibodies). To confirm agglutination, red blood cell clumps were examined under a microscope. A conventional antiserum Agglutination test/reaction was used to determine blood types (glass slide method). Wright's Capillary tube and Duke's filter paper were used to assess CT and BT.[9] The current study was carried out between 3 and 4:30 p.m. in the haematology laboratory. Two investigators gave the BT and CT tests and collected data from the subjects. Duke's method produced an average bleeding time of 2 to 6 minutes by finger prick. The time required for the bleeding to stop was calculated by blotting the blood droplet from the wound with blotting paper every 30 seconds. Multiply the number of dots on the filter paper by thirty seconds to get BT. The capillary tube chooses a clotting time between 3 and 8 minutes. Under strict aseptic conditions, blood was drawn by a conventional skin incision. Blood clotting time was ascertained by severing a capillary tube after two minutes, 1-2 centimetres from one end every thirty seconds until a fibrin thread formed. The estimation of bleeding and clotting times was timed with a stopwatch. We determined the mean BT and CT values of male and female medical volunteers with various blood types. For ease of calculation, BT levels were categorised as less than 2 minutes, 2 to 6 minutes, and greater than 6 minutes. Similarly, CT was classified as less than 3 minutes, between 3 and 8 minutes, and over 8 minutes.

Ethical Clearance:

IEC authorisation gained via IEC authorisation (No. IEC/GMC/Cat C/2021/532, dated 24/05/2021)

Statistical Analysis:

We compared BT and CT among blood types using an unpaired t-test in SPSS 26.0. An additional Chi-square test study was carried out to determine the relationship between blood types and BT/CT. All information was presented as a percentage, a range, and a Mean with a Standard Deviation. A p-value of less than 5% was judged statistically significant.

Results

In our investigation of the relationship between blood types and BT and CT haematological parameters, two hundred and fifty 17- to 20-year-old participants were recruited. The analysed data are shown in tables 1 through 4. Our analysis revealed the following blood group distribution: 39.6% B > 34% O > 21.2% A > 5.2% AB; Rh-positive 95.2% > Rh-negative 4.8%. Fifty-three individuals have blood type A, 99 individuals have blood type B, 13 individuals have blood type AB, and 85 individuals have blood type O. In comparison, 238 individuals have blood group Rh-positive, and 12 individuals have Rh-negative blood. A Chi-square study established a connection between the ABO blood group and BT (p=0.938) and CT (p=0.652) that was not statistically significant (Table 2). The unpaired t-test revealed that BT levels were 2.41 ±0.58 min in the A blood type (p=0.082), 2.47 ±0.63 min in the B blood type (p=0.234), 2.58 ±0.91 min in the AB blood type (p=0.923), 2.35 ±0.51 in the O blood type (p=0.681), 2.43 ±0.63 min in the Rh-positive group (p=0.054), and 2.25 ±0.70 min in Rh-negative blood group (p=0.924).

Likewise, CT values for blood type A were 5.07 ±1.72 minutes (p=0.117), 5.14 ±1.58 minutes for B blood type (p=0.077), and 5.83 ±1.72 minutes for the AB blood type (p=0.095), 4.97 ±1.45 minutes for the O blood type (p=0.444), 5.12 ±1.56 minutes for the Rh-positive blood group (p=0.005), and 4.78 ±1.85 minutes for the Rh-negative blood (p=0.915). In comparing blood groups with BT and CT, AB and B blood groups exhibited higher mean values for BT and CT. BT/CT is affected by blood type and gender, with females having a longer BT/CT (Table 3&4). Screening and prevention must commence before the onset of bleeding disorders.

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Table 1: A comparison of the demographic features of female and male individuals.

Parameter	Gender	Number	Mean	SD	Significance	
					t-value	p-value
Age	Females	125	18.1040	0.7114	-4.137	0.097
	Males	125	17.8320	0.6316		
Weight	Females	125	50.7040	2.3211	22.341	<0.0001
	Males	125	60.8320	4.5058		
Height	Females	125	155.1680	3.9772	38.110	<0.0001
	Males	125	170.0000	4.2464		
BMI	Females	125	21.0417	1.3578	-5.927	<0.0001
	Males	125	19.8568	1.7753		

Table 2: Association of BT and CT with ABO blood types

Blood Types	BT (min)			Total	CT (min)			Total
	< 2	2-6	>6		<3	3-8	>8	
A	10	43	0	53	1	52	0	53
B	15	84	0	99	1	97	1	99
AB	2	11	0	13	0	13	0	13
O	13	72	0	85	0	84	1	85
Total	40	210	0	250	2	246	2	250
Chi. Sq. Value	0.413				1.634*			
p-value	0.938				0.652			
	*In case clubbing the B, AB, & O Groups Chi. Square value=1.00 & p=0.31							

Table 3: Blood group-wise (ABO) comparison of BT (min) and CT (min) between females and males

Blood Group	Parameters	Gender	Number	Mean	Std. Deviation	Significance	
						t-value	p-value
A	BT (min)	Females	27	2.4135	.58712	1.775	.082
		Males	26	2.1204	.61382	1.777	.082
	CT (min)	Females	27	5.0769	1.72448	1.594	.117
		Males	26	4.4259	1.21453	1.584	.120
B	BT (min)	Females	49	2.4750	.63938	1.198	.234
		Males	50	2.3112	.71903	1.197	.234
	CT (min)	Females	49	5.1400	1.58771	1.787	.077
		Males	50	4.5918	1.46014	1.789	.077
AB	BT (min)	Females	7	2.5833	.91742	.099	.923
		Males	6	2.5357	.82195	.098	.924
	CT (min)	Females	7	5.8333	1.72240	1.825	.095
		Males	6	4.4286	1.01770	1.753	.118
O	BT (min)	Females	42	2.3547	.51822	.412	.681
		Males	43	2.3095	.49018	.413	.681
	CT (min)	Females	42	4.9767	1.45550	.767	.445
		Males	43	4.7738	.91866	.771	.444

Table 4: Blood group-wise (Rh) comparison of BT (min) and CT (min) between females and males

Blood group	Parameters	Gender	Number	Mean	SD	Significance	
						t-value	p-value
Rh+	BT (min)	Females	120	2.4386	.60176	1.938	.054
		Males	118	2.2833	.63340	1.939	.054
	CT (min)	Females	120	5.1229	1.56065	2.848	.005
		Males	118	4.6042	1.23311	2.842	.005
Rh-	BT (min)	Females	5	2.2500	.70711	-.097	.924
		Males	7	2.2143	.56695	-.093	.928
	CT (min)	Females	5	4.7857	1.82248	.097	.925
		Males	7	4.7000	.83666	.109	.915

Discussion

Among the 250 patients in this trial, 125 were female, and 125 were male. Male and female students were the same age (17-20). B (39.6 per cent) was the most prevalent ABO blood group among young people, followed by O (34 per cent), A (21.2 per cent), and AB (5.2 per cent). Both Patil SV et al. and Roy B Banerjee et al. observed a similar pattern of blood group prevalence: B > O > A > AB.[10-11] In contrast to our findings, Pramanik T & colleagues discovered that the majority of medical students (35.2%) had blood type O, followed by A, B, and AB.[12]

This study investigates the relationship between ABO blood groupings and BT or CT. In 53 cases involving A blood types, 10 (18.87%) had BT values of less than 2 minutes, while 43 (81.13%) had normal BT levels and none had protracted BT. 15 (15.15 per cent) of the 99 B blood groups had low BT values, while 84 (84.85 per cent) had normal BT levels and none had prolonged BT. Two out of thirteen cases in the AB blood group (15.38%) had low BT levels, whereas eleven (84.62%) had normal BT levels. None had protracted BT. 13 out of 85 instances in the O blood group had low BT levels, whereas 72 (84.71 per cent) had normal BT levels and none had prolonged BT levels. Based on a chi-square study between blood types and BT levels, a non-significant connection between ABO blood groups and BT was found (p=0.938). Similar findings were reported by Verma A et al. and Jha RK & colleagues.[13-14] Unlike our results, investigations by Waghmare PV & Muniyappanavar NS and Mahapatra B & Mishra N have demonstrated a substantial connection between blood types and BT.[15-16] Similarly

when analysing the relationship between blood types and CT. One out of 53 instances (1.89 per cent) in the A blood group had CT levels less than three minutes, whereas 52 (98.11 per cent) had normal CT levels and none had prolonged CT. One out of 99 cases involving B blood groups had low CT levels, while 97 (97.98 per cent) had normal CT levels and one (1.01 per cent) had prolonged CT levels. None of the 13 AB blood groups had CT levels of less than 3 minutes, all 13 (100%) had normal CT levels, and none had prolonged CT levels. None of the 85 O blood group individuals had CT levels of less than 3 minutes, 84 (98.82%) had normal CT levels, and one (1.18%) had prolonged CT levels. Based on a chi-square study between blood groups and CT levels, no correlation was found between ABO blood groups and CT (p= 0.652). Researchers such as Verma A et al. and Jha RK & colleagues have also reported comparable findings.[13-14] Unlike our results, investigations by Waghmare PV & Muniyappanavar NS and Mahapatra B & Mishra N have demonstrated a substantial correlation between blood types and CT.[15-16]

Blood types with BT and CT levels did not differ significantly between females and males, except for the Rh-positive group and CT levels (p= 0.005). The mean concentrations of women were found to be greater than those of men. In our study, the pattern of mean values of BT and CT were determined to be AB> B> A> O and Rh-positive > Rh-negative for the various blood types. Comparing the bleeding and clotting times of various blood groups among male and female college students, our findings were comparable to those of previous research.[14,16] Others, however, have uncovered inconsistent results.[15,17]

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In most studies with statistically significant findings regarding the BT and CT of various blood groups, women were shown to have higher BT and CT than men. This could be attributed to the presence of oestrogen, which decreases plasma fibrinogen levels and prolongs clotting time.[18]

Conclusion

First, the bleeding and clotting times of four ABO blood groups of young adults were comparable. Second, there is no evidence of a significant association between ABO groups and bleeding time (p =0.938) or clotting time (p = 0.652) in the subjects of this study. Except for Rh-positive blood groups and CT levels (p = 0.005), no significant gender-based differences were observed when comparing ABO blood groups with BT and CT. Fourth, slightly increased values of BT and CT were observed in female subjects. Ultimately, the mean BT & CT levels trend in various blood groups was determined to be AB > B > A > O and Rh-positive > Rh-negative. In addition, a large cohort study is necessary to close the knowledge gap regarding this association.

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References

1. Kim E. Barrett, Susan M. Barman, Heddwen L. Brooks, Jason X.-J. Yuan. Ganong's Review of Medical Physiology. 26th ed. India: Mc Graw Hill Education Lange; 2019.p.552-57.

2. Garratty G, Dzik W, Issitt PD, Lublin DM, Reid ME, Zelinsky T. Terminology for blood group antigens and genes-historical origins and guideline in the new millennium. Transfusion. 2000; 40: 477-89.

3. Mollison PL. The genetic basis of the Rh blood group system. Transfusion. 1994; 34: 539-41.

4. Desch KC. Regulation of plasma von Willebrand factor. F1000 Res. 2018; 7:96.

5. Flood VH, Christopherson PA, Gill JC, Friedman KD, Haberichter SL, Bellissimo DB, et al. Clinical and Laboratory variability in a cohort of patients diagnosed with type 1 VWD in the United States. Blood. 2016 May 19; 127(20): 2481-8.

6. Morelli VM, De Visser MCH, Vos HL, Bertina RM, Rosendaal FR. ABO blood group genotypes and the risk of venous thrombosis: effect of factor V Leiden. J Thromb Hemost. 2005; 3(1): 183-85.

7. Reddy VM, Daniel M, Bright E, Broad SR, Moir AA. Is there an association between blood group O and epistaxis? J. Laryngol Otol 2008 Apr; 122(4): 366-68.

8. Jenkins PV, O' Donnell JS. Does the ABO blood group determine plasma von Willebrand factor levels: a biological function after all? Transfusion. 2006 Oct; 46(10): 1836-44.

9. Gahi CL. Textbook of Practical Physiology. 9th ed. New Delhi: Jaypee Brothers Medical Publishers (P) Ltd; 2019.p.68-83.

10. Patil SV, Gaikwad PB, Vaidya SR, Patil US, Kittad SD. To study the blood group distribution and its relationship with bleeding and clotting time in dental students. Asian J Medical Pharmaceutical Sci. 2013; 1(1): 1-4.

11. Roy B, Banerjee I, Sathian B, Mondal M, Saha CG. Blood group distribution and its relationship with bleeding time and clotting time: A medical school-based observational study among Nepali, Indian and Sri Lankan students. Nepal J Epidemiol. 2011; 1(4): 135-40.

12. Pramanik T, Saikia TC, Bandopadhyya M. Preliminary report on the trend of blood group distribution among Nepalese and Indian medical students. J Nepal Med Assoc. 2001; 41: 258-61.

13. Verma A, Chaurasia R, Adhana R, Ballabh J, Kaur J. Interdependence of major blood group with bleeding time and clotting time. Medpulse Int J Physiol 2019; 11: 34-7.

14. Jha RK, Kushwaha MS, Kushwaha DK, Tiwari S, Bhandari A, Nepal O. Blood group distribution and its relationship with bleeding and clotting time in undergraduate medical students. Int J Res Rev 2017; 4: 10-5.

15. Waghmare RV, Muniyappanavar NS. Influence of blood groups on bleeding and clotting time. Int Physiol 2018; 6: 200-4.

16. Mahapatra B, Mishra N. Comparison of bleeding time and clotting time in different blood groups. Am J Infect Dis 2009; 5: 113-15.

17. Mirdha M, Jena SK. Distribution of blood group and its relation to bleeding time and clotting time. Int J Med Sci Public Health 2016; 5: 2566-9.

18. Ercan M, Yegin E, Akdeniz H, Irmak H, Bayiroglu F, Tuncer I. Effect of oestrogen on fibrinogen clotting time in rabbits. Trans J Vet Anim Sci 1998; 22: 137-40.

Study on Asthma and Chronic Obstructive Pulmonary Disease Overlaps among Patients with Obstructive Airway Diseases

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Abstract

Background and Aim: Although asthma and chronic obstructive pulmonary disease (COPD) are clinically distinct diseases, they represent biologically diverse and overlapping clinical entities and it has been observed that they often co-occur. Some research and theorizing suggest there is a common comorbid condition termed asthma-chronic obstructive pulmonary disease overlap (ACO). However, the existence of ACO is controversial.

Material and Methods: This is prospective, observational and descriptive study conducted at tertiary care institute of Gujarat for the duration of 1 year. Among chronic airway diseases who were classified into three groups (COPD, asthma and ACO). Patients with COPD and ACO were diagnosed according to GOLD guidelines 2020 and patients with asthma were diagnosed according to Global Initiative for Asthma (GINA) guidelines 2020. Total 150 participants were included in the research. All patients are subjected to full history taking, clinical examination, full laboratory examinations, chest radiography, spirometry and post bronchodilator reversibility test was performed and sputum analysis, where induction of sputum by hypertonic saline or mannitol is done by a trained staff with strict airborne respiratory precautions.

Results: We found that 71.42% of ACO group, 79.48% of asthma group and 25% of COPD group had a positive history of atopy. Comparison of study groups regarding sputum eosinophils revealed that 30.15 % of ACO group, 76.92% of asthma group and 31.25% of COPD group had positive sputum eosinophils.

Conclusion: ACO addresses an enormous rate among patients with obstructive airway diseases. It shares a few highlights of asthma like atopy and positive sputum eosinophilia, and a few highlights of COPD like old age of shows and positive smoking history.

Key Words: Asthma, Asthma-Chronic Obstructive Pulmonary Disease Overlap, Chronic Obstructive Pulmonary Disease, Sputum Eosinophils

Introduction

Asthma with incompletely reversible obstacle of airflow – that, relies upon adjustment in first expiratory volume (FEV1) with bronchodilators – with or without emphysema or diminished carbon monoxide diffusing capacity (DLCO) to <80%

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anticipated.[1] Chronic obstructive pulmonary disease (COPD) with emphysema joined by somewhat reversible or reversible airflow obstruction, with or without natural hypersensitivities or diminished DLCO. Although asthma and COPD are clinically distinct diseases, they represent biologically diverse and overlapping clinical entities. Asthma and COPD overlap commands considerable attention and is discussed comprehensively in guidelines such as the Global Initiative for Asthma and the Global Initiative for Lung Disease for COPD.[2-4]

Although asthma and COPD are distinct conditions, their symptoms are similar and the differential diagnosis may therefore be difficult.[5,6] Furthermore, asthma and COPD often occur together, referred to as asthma-COPD overlap syndrome (ACOS), and with other comorbid conditions.[7-10]Although asthma and COPD are distinct conditions, their symptoms are similar and the differential diagnosis may therefore be difficult. Furthermore, asthma and COPD often occur together, referred to as asthma-COPD overlap syndrome (ACOS), and with other comorbid conditions.

In clinical practice, isolating asthma from COPD is troublesome as a result of the corresponding characters regularly to the two infections. Existing guideline for asthma, like to the National Asthma Education and Prevention Program, NIH, Expert Panel Report, and COPD, as both Global Initiative for Chronic Obstructive Lung Disease (GOLD) treatment rules and the understanding enunciation by the American College of Chest Physicians, American College of Physicians, American Thoracic Society (ATS) and European Respiratory Society, also don't totally get the heterogeneity of asthma and COPD, including chronic obstructive pneumonic disease overlap syndrome (ACOS), nor do they plan clinicians for the variable reactions to pharmacotherapies, especially the issues of corticosteroid resistance. [11-15]

For finding, two critical criteria (FEV1 >15% and >400 ml after bronchodilator or sputum eosinophils or history of asthma) and two minor standards (increased IgE or history of atopy or FEV1 >12% and >200 ml after bronchodilator) are proposed.[16] ACO prevalence has shifted broadly in investigations: from 0.9% to 11.1% in everybody, from 11.1% to 61.0% in asthma patients, and from 4.2% to 66.0% in COPD patients. ACOS commonness was considerably higher in extreme asthma centers contrasted and general pneumonic facilities.

The treatment responses of patients with ACO could be important for clinical decisions, suggesting potential value in additional, more precise characterization of this disease entity.[10] Little epidemiologic research has critically evaluated patterns of clinical diagnosis using the commonly used overlapping International Classification of Diseases, Ninth Revision (ICD-9) code patterns for asthma and COPD which can suggest possible ACO, indicating an important gap in knowledge. Such patterns of diagnosis might provide additional clues to better characterize the disease entity. A better understanding of the features of ACO might lead to improved diagnosis and treatment of this entity and improvements in public health for those patients affected by airways disease. Respiratory diseases, notably asthma and COPD, have resulted in immense clinical and economic challenges for public health.[17,18] Health services vigilantly investigate and seek to understand the epidemiological trends of respiratory diseases in the US, historically striving to maintain a state of readiness to respond.[19-21] While infectious respiratory conditions remain a major concern, changing environmental conditions and stresses from expanding industrial, military, and agricultural activities require greater vigilance and laboratory, hospital, and rehabilitation resources.

There is a need to re-evaluate the concept of asthma and chronic obstructive pulmonary disease (COPD) as separate conditions, and to consider situations when they may coexist, or when one condition may evolve into the other.

Material and Methods

This is prospective, observational and descriptive study conducted at tertiary care institute of Gujarat for the duration of 1 year. Among chronic airway diseases who were classified into three groups. Patients with COPD and ACO were diagnosed according to GOLD guidelines 202012 and patients with asthma were diagnosed according to Global Initiative for Asthma (GINA) guidelines 2020.[14]

Ethical approval was taken from the institutional ethical committee. Patients of either gender between ages above 40 years, Patient willing to give informed written consent were included in the research.

Patients with Restrictive lung disease, bronchiectasis, COPD exacerbation and vocal cord dysfunction were excluded from the study.

All patients are subjected to full history taking, clinical examination, full laboratory examinations, chest radiography, spirometry and post bronchodilator reversibility test was performed and sputum analysis, where induction of sputum by hypertonic saline or mannitol is done by a trained staff with strict airborne respiratory precautions. The procedure should be stopped when the patient has produced 5–10 ml of sputum, about 15 min of nebulization is reached. The patient complained of dyspnoea, chest tightness or wheeze. Sputum processing and staining and count were done with assessment of sputum eosinophils.

Statistical analysis

The recorded data was compiled and entered in a spreadsheet computer program (Microsoft Excel 2007) and then exported to data editor page of SPSS version 15. For all tests, confidence level and level of significance were set at 95% and 5% respectively.

Results

This study was conducted on 150 patients with chronic airway diseases (COPD, asthma and asthma COPD overlap) were selected. In Table 1, regarding the age difference between groups, it was found that patients who were diagnosed as having COPD and ACO were with mean age of 58.12±8.10 and 56.70±7.20 years, respectively. The men age of patients of Asthma was 57.90±9.22. (ACO=asthma chronic obstructive pulmonary disease overlap). It included 59 (65.5%) males and 31(34.4%) females [Table 2].

Table 3 Demonstrate comparison of groups regarding history of atopy. We found that 71.42% of ACO group, 79.48% of asthma group and 25% of COPD group had a positive history of atopy. In Table 4, comparison of study groups regarding sputum eosinophils revealed that 30.15% of ACO group, 76.92% of asthma group and 31.25% of COPD group had positive sputum eosinophils.

Table 1: Age differences between the study groups

Variable	COPD	ACO	Asthma
Number of Patients	48	63	39
Mean±SD	58.12±8.10	56.70±7.20	57.90±9.22

Table 2: Gender wise distribution among the study group

Variable	Males	Females	Total
Number of Patients	99	51	39
Percentage	66	34	100

Table 3: Comparison of studied groups regarding history of atopy

Atopy	Diagnosis		
	COPD (n=48)	ACO (n=63)	Asthma (n=39)
No			
Count	36	18	8
% within diagnosis	75	28.57	20.51
Yes			
Count	12	45	31
% within diagnosis	25	71.42	79.48

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Table 4: Comparison of study groups regarding sputum eosinophils

Sputum Eosinophils	Diagnosis		
	COPD (n=48)	ACO (n=63)	Asthma (n=39)
No			
Count	33	44	9
% within diagnosis	68.75	69.84	23.07
Yes			
Count	15	19	30
% within diagnosis	31.25	30.15	76.92

Discussion

Knowledge about the cost of different diseases is useful in planning and implementation of relevant health-policy interventions. It was discovered that the pervasiveness of ACO changes among various distributed examinations, and this might be identified with the distinction in the contemplated populaces and contrasts in demonstrative measures.[22-24] For assessment regarding ACO, the assessment of airway inflammation would be significant. Asthma is more eosinophilic, and COPD is normally more neutrophilic. Whereas, there is heterogeneity with each disorder and overlap between the two conditions. In spite of the fact that there are a few changes over time and in response of treatments, numerous patients show relative dependability in aggravation aggregates, recommending steady basic underlying molecular mechanisms. The development in molecular technologies can possibly recognize subgroups inside ACO on a molecular level.[25] It is suggested that eosinophilic airway inflammation is a key prognostic factor for patients with ACO and COPD. Kolsum U et al. compared the management for minimizing eosinophilic airway inflammation with the treatment according to traditional guidelines. By reducing the sputum eosinophil count, the management strategy that aims to minimize eosinophilic airway inflammation was accompanying with a reduction in severe exacerbations of COPD.[26]

Studies have shown that patients with ACOS have greater health care resource utilization, including more exacerbations, increased hospitalizations, and more outpatient and physician office visits [20-22] The results demonstrated that patients with asthma and COPD have a higher rate of additional comorbid conditions than do those who do not have COPD,

even after matching for age, sex, and some baseline demographic characteristics. Furthermore, after matching on these factors, health care costs among patients with COPD was roughly double that of patients with asthma alone. All-cause costs were substantially higher than asthma-related costs, which highlights the importance of recognizing and treating comorbidities in patients with asthma, especially those with comorbid COPD. Asthma and COPD are not singular diseases but rather parts of different pathological mechanisms, and treatment needs to shift from a focus on a single disease to controlling multiple comorbidities.

To decide whether patients have asthma, it is essential to demonstrate that eosinophilic airway inflammation is not only a previous occurrence however a proceeding with condition. It is proposed that eosinophilic airway inflammation is a main prognostic factor for patients with ACO and COPD. Kolsum U et al. revealed that management for minimising eosinophilic airway inflammation with the treatment as indicated by conventional guidelines.[26] By decreasing the sputum eosinophil check, the management system that aims to minimise eosinophilic airway inflammation was accompanying with a decrease in severe exacerbations of COPD.[27] It is proposed that eosinophilic airway inflammation is a main prognostic factor for patients with ACO and COPD. Kolsum U et al. revealed that management for minimising eosinophilic airway inflammation with the treatment as indicated by conventional guidelines.[26] By decreasing the sputum eosinophil check, the management system that aims to minimise eosinophilic airway inflammation was accompanying with a decrease in severe exacerbations of COPD.[27] Furthermore, Chung WS et al. found that in

the subgroup with a higher blood eosinophil concentration among COPD patients, the inhibition of exacerbation by triple therapy with an inhaled corticosteroid, long-acting β2 agonist, and long-acting muscarinic antagonist was greater than that with long-acting muscarinic antagonist monotherapy in the double-blind, parallel group, randomised controlled trial.[28]

Despite the strengths inherent in its design, these study results must be viewed against important limitations. The population was restricted to patients with asthma with uncontrolled disease because patients with uncontrolled disease drive health care costs because of ED and inpatient hospitalizations. Results may not be generalizable more broadly.

Conclusion

ACO addresses an enormous rate among patients with obstructive airway diseases. It shares a few highlights of asthma like atopy and positive sputum eosinophilia, and a few highlights of COPD like old age of shows and positive smoking history.

Ethical approval was taken from the institutional ethical committee and written

Informed consent was taken from all the participants.

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References

1. Renthlei L, Wangkheimayum A, Kshetrimayum S, Ningthoujam P, Sangtam N, Datta S, et al. Prevalence and characteristics of asthmachronic obstructive pulmonary disease overlap among asthma and chronic obstructive pulmonary disease patients in a tertiary care center in Northeast India. J Med Soc. 2019;33:122–7.

2. Postma DS, Rabe KF. The Asthma-COPD Overlap Syndrome. N Engl J Med. 2015 Sep 24;373(13):1241–9. doi: 10.1056/NEJMra1411863. [PubMed] [CrossRef] [Google Scholar]

3. 2017 Pocket Guide for Asthma Management and Prevention. 2017. Aug 30, http://ginasthma.org/2017-pocket-guide-for-asthma-management-and-prevention/ webcite.

4. Global Initiative for Chronic Obstructive Lung Disease Diagnosis of diseases of chronic airflow limitation: asthma, COPD and asthma-COPD overlap syndrome (ACOS) 2015.

5. de Marco R, Pesce G, Marcon A, et al. The coexistence of asthma and chronic obstructive pulmonary disease (COPD): prevalence and risk factors in young, middle-aged and elderly people from the general population. PLOS One 2013;8:e62985.

6. Shaya FT, Dongyi D, Akazawa MO, et al. Burden of concomitant asthma and COPD in a Medicaid population. Chest 2008;134:14–9.

7. Marsh SE, Travers J, Weatherall M, Williams MV, Aldington S, Shirtcliffe PM, Hansell AL, Nowitz MR, McNaughton AA, Soriano JB, Beasley RW. Proportional classifications of COPD phenotypes. Thorax. 2008 Sep;63(9):761–7.

8. Miravitlles M, Soriano JB, Ancochea J, Muñoz L, Duran-Tauleria E, Sánchez G, Sobradillo V, García-Río F. Characterisation of the overlap COPD-asthma phenotype. Focus on physical activity and health status. Respir Med. 2013 Jul;107(7):1053–60.

9. van BJFM, Román-Rodríguez M, Palmer JF, Toledo-Pons N, Cosío BG, Soriano JB. Comorbidome, Pattern, and Impact of Asthma-COPD Overlap Syndrome in Real Life. Chest. 2016 Apr;149(4):1011–20.

10. Gibson PG, Simpson JL. The overlap syndrome of asthma and COPD: what are its features and how important is it? Thorax. 2009 Aug;64(8):728–35. doi: 10.1136/thx.2008.108027.

11. Standards for diagnosis and care of patients with chronic obstructive pulmonary disease. Am J Respir Crit Care Med. 1995;152:77–121.

12. Global Initiative for Chronic Obstructive Lung Disease (GOLD). (2021) Global Strategy for Diagnosis, Management and Prevention of COPD; 2021. Available from: https://goldcopd.org/. 13. Joint project of GOLD and GINA. Diagnosis of diseases of chronic airflow limitation: asthma, COPD and asthma-COPD overlap syndrome (ACOS). Global Initiative for Asthma, Global Initiative for Chronic Obstructive Lung Disease. Available at: http://www.ginasthma.org and http://www.goldcopd.org. Last accessed 2021 on July 14. 14. Global Initiative for Asthma (GINA) 2021. asthma, COPD and asthma–COPD overlap syndrome (ACOS) [accessed 2021]. Available from https://ginasthma.org.

13. WHO Programmes for Chronic Respiratory Diseases – Burden of COPD. Available from: http://www.who.int/respiratory/copd/burden/ en/. Last accessed on 2021 Jun 24.

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14. Henriksen AH, Langhammer A, Steinshamn S, Mai XM, Brumpton BM. The Prevalence and Symptom Profile of Asthma–COPD Overlap: The HUNT Study. COPD: J Chronic Obstr Pulm Dis. 2018;15(1):27– 35. doi:10.1080/15412555.2017.1408580.

15. Ford ES, Croft JB, Mannino DM, Wheaton AG, Zhang X, Giles WH. COPD surveillance--United States, 1999-2011. Chest. 2013 Jul;144(1):284–305.

16. Moorman JE, Akinbami LJ, Bailey CM, Zahran HS, King ME, Johnson CA, Liu X. National surveillance of asthma: United States, 2001-2010. Vital Health Stat 3. 2012 Nov;(35):1–58.

17. David W. Chronic respiratory diseases-the new look in the Public Health Service. Am J Public Health Nations Health. 1967 Aug;57(8):1357–62.

18. Merrill MH Public health responsibilities and program possibilities in chronic respiratory diseases. Am J Public Health Nations Health. 1963 Mar;53(3)Suppl:25–33.

19. Roberts A Public health service activities in chronic respiratory diseases. Public Health Rep. 1965 Apr;80:336–8.

20. Oca MM, Varela MVL, Laucho-Contreras ME, Casas A, Schiavi E, Mora JC, et al. Asthma–COPD overlap syndrome (ACOS) in primary care of four Latin America countries: the PUMA study. BMC Pulm Med '. 2017;17(1):69. doi:10.1186/s12890-017-0414-6.

21. Van DBM, Aalbers R. The asthma-COPD overlap syndrome: how is it defined and what are its clinical implications? J Asthma Allergy. 2016;9:27–35.

22. Van B, Román-Rodríguez M, Palmer JF, Toledo-Pons N, Cosío BG, Soriano JB, et al. Comorbidome, Pattern, and Impact of AsthmaCOPD Overlap Syndrome in Real Life. Chest. 2016;149(4):1011–20.

23. Kobayashi S, Hanagama M, Yamanda S, Ishida M, Yanai M. Inflammatory biomarkers in asthma-COPD overlap syndrome. Int J Chron Obstruct Pulmon Dis. 2016;11:2117–23.

24. Kolsum U, Ravi A, Hitchen P, Maddi S, Southworth T, Singh D, et al. Clinical characteristics of eosinophilic COPD versus COPD patients with a history of asthma. Respir Res. 2017;18(1):73.

25. Jindal SK, Aggarwal AN, Gupta D, Agarwal R, Kumar R, Kaur T, et al. Indian Study on Epidemiology of Asthma, Respiratory Symptoms and Chronic Bronchitis in adults (INSEARCH). Int J Tuberc Lung Dis. 2012;16(9):1270–7.

26. Chung WS, Lin CL, Kao CH. Comparison of acute respiratory events between asthma-COPD overlap syndrome and COPD patients: A population-based cohort study. Med (Baltimore). 2015;94:755.

Outcomes of Complications of Chronic Otitis Media in Tertiary Care Facilty in Western Uttar Pradeh

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Abstract

Objectives: This study aims to investigate the frequency and management of complications of chronic suppurative otitis media(CSOM).

Patients and Methods: Out of 376 patients with CSOM, 44 patients (25 males, 19 females; mean age 48.5±3.5 years; range 21to 76 years) meeting study criteria were enrolled in this descriptive cross sectional study which was conducted at the Department of Ear Nose and Throat, Head and Neck Surgery. All newly diagnosed patients having CSOM with complications were enrolled. The complications were treated first. Intracranial abscesses

were evacuated by neurosurgeons. Radical and modified radical mastoidectomy were performed.

Results: Majority of the patients presented in the second and third decade of life (21-30 years: 27.27%, 31-40 years: 18.18%).Most of the patients (59.1%) had lower socioeconomic status. Canal wall down mastoidectomy was the most common (79.5%) procedure performed. Cholesteatoma was the most common operative finding (100%). Among extracranial complications, subperiosteal abscess was the most common finding (38.63%), while extradural abscess outnumbered (22.72%) in intracranial complications.

Conclusion: Complications of CSOM commonly affect younger people with low socioeconomic status. Collaborating with neurosurgeons may assist in the successful management of this infection.

Keywords: Extracranial complications; intracranial complications; suppurative otitis media.

Introduction

Chronic suppurative otitis media (CSOM) is a chronic inflammation (>3 month duration) of the mucoperiosteal lining of the middle ear cleft.

The prevalence of CSOM depends on age, poor socioeconomic condition, poor housing, overcrowding and lack of access to medical care.[1] Chronic suppurative otitis media isclassified into two main categories, tubotympanic

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and atticoantral disease. The former is considered 'safe' from the point of view of complications while the latter has been considered a 'dangerous' form of disease in view of the risks of otogenic complications.[2] Central perforations in the pars tensa of varying size and position are seen in this disease. In this condition the risk of developing complications such as brain abscess are very rare but some minor complications may develop like otitis externa, granulation tissueand mucosal polyp.[3] Atticoantral disease most commonly involves the epitympanum. The typicalfeature of atticoantral disease is the presence ofcholesteatoma. The relevant pathophysiology of cholesteatoma is negative middle ear pressure,invasion of squamous epithelium and squamous metaplasia of middle ear mucosa. Marginal and attic perforations are commonly found in this disease which expose the anatomical structures of the attic, antrum and mastoid aircells system.[2,4] In atticoantral disease various extracranial complications like moastoiditis,subperiosteal abscess, facial nerve paralysis,labyrinthitis and petrositis with bone destruction may occur. The various intracranial complications are extradural abscess, subdural abscess,meningitis, encephalitis, brain abscess, lateral sinus thrombosis and otitic hydrocephalus.[3,5] The most common bacterial pathogens of otitis media are *Streptococcus pneumoniae*, *Hemophilus influenza* and *Moraxella catarrhalis*. Other pathogens responsible for otitis media are *Staphylococcus aureus*, *Escherichia coli*, *Klebsiella species*, *Pseudomonas aeruginosa* and *Proteus species*. However mixed type (aerobic and anaerobic) pathogens are commonly isolated from chronic suppurative otitis media[5]

Material and Methods

This descriptive cross sectional study was conducted at the department of Ear, Nose, Throat,

Head (ENT) and Neck Surgery,Saraswathi institute of medical sciences between January 2018 and December 2021 (3 years). Out of 376 patients with CSOM who visited our department during the study, only 44 patients (25 males and 19 females; mean age 48.5±3.5 years; range 21 to 76 years) were enrolled in the study after fulfilling inclusion criteria. All newly-diagnosed patients with chronic suppurative otitis media and complications of any

age, race and gender were included in this study. Patients having complications due to acute otitis media and those where no surgical intervention was carried out were excluded from the study. Patients diagnosed with CSOM with complications were admitted into the ENT department. An intravenous (i.v.) line was maintained and all the patients were given intravenous antibiotics while critically ill patients were subjected to a quadruple antibiotic regimen consisting of benzyl penicillin (200,000 to 500,000 units i.v. 6-hourly), chloromycetin (50 mg/kg body weight 8-hourly), metronidazole (7.5 mg/kg body weight i.v. 8-hourly), and gentamycin (1.5 mg/kg body weight i.v. 12-hourly). This medical treatment was given to patients for at least 2-3 weeks depending upon the severity of the disease.After the complications of CSOM were properly treated, the disease of the ear was then dealt with surgically. Radical and modified radical mastoidectomy was carried out depending upon the extent and severity of the disease. A detailed history regarding ear discharge, onset, duration, frequency and associated illness was taken from patients or parents. Thorough examination of ears, nose and throat specifically focusing on ears and otogenic complications was performed. Besides routine investigations, pure tune audiometry (if possible), computed tomography scan, and magnetic resonance imaging (in cases where CT scan was not informative) were obtained to determine the site and extent of the complication and its management. In cases of otogenic abscess urgent evacuation was arranged. Intracranial abscesses were drained by neurosurgical colleagues while extracranial abscess was treated by ENT surgeons. Intracranial abscess were urgently treated by neurosurgeon with procedures like bur-hole aspiration, craniotomy and transmastoid excision depending upon the location of the abscess. In case of intracranial complications, primary disease in the ear was treated 3-4 weeks after overcoming the complications. The complications were treated conservatively/surgically before embarking on the treatment of the primary focus in the ears. Informed consent was obtained from patients/ parents after explaining the procedure, its risks, benefits and associated complications. The study was approved by the hospital ethical committee. All patients were followed up to one year to look for any recurrence of

complications. The data was collected on a preformed pro forma and statistical analysis was performed using SPSS version 17.0 (SPSS Inc., Chicago, IL, USA) software program.Frequency and percentage were calculated for qualitative data and mean and standard deviationwere calculated for quantitative data.

Results

Majority of the patients presented in the second and third decade of life (21-30 years, 27.27%, 31-40 years, 18.18%). Among these patients 26 (59.1%) had lower socioeconomic status while 11 (25%) and seven (15.9%) were from middle and high socioeconomic classes respectively. Most of these patients were received in summer and autumn seasons of the year. Mild to moderate hearing loss was observed in 36 patients (77.27%), while severe to profound hearing loss was recorded in eight patients (18.18%). The main presentation of these patients was discharging ears in all cases (100%) and the most common otoscopic finding was atticoantral perforation in the drum (93.18%). Canal wall down mastoidectomy was carried out in 35 patients (79.5%), modified radical mastoidectomy in seven (15.9%) and tympanoplasty in two (4.5%). Intracranial abscesses were primarily evacuated by neurosurgeons via bur-hole aspiration (45.4%) and craniotomy (25%). Operative findings in this study were cholesteatoma (100%), granulation tissues in 37 (84.1%), and ossicular erosion in 21 (47.7%). Extracranial complications were observed in 31 patients (70.45%). Among these subperiosteal abscess was the most common finding (38.63%), followed by facial nerve palsy (13.63%). Intracranial complications were present in 34 patients (77.27%). Among these, extradural abscess was prominent (22.72%). Meningitis and subdural abscess were recorded in 18.18% and 11.36% respectively. Two patients died due to complications, hence the mortality was 4.5%.

Discussion

Complication rates related to CSOM have been dramatically reduced since the emergence of the antibiotic era. The rapid increase in welfare and the development of health care systems in industrialized countries have made it possible to offer proper medical treatment to patients[8,9]

However, these infections remain major challenges with respect to the diagnosis and management of CSOM in developing countries. Chronic suppurative otitis media may result in complications among individuals irrespective of gender.[10] In this study maleswere affected more than females with male: female ratio of 1.3:1 in accordance with the study of Baig with male predominance (56.72%), but differs from the results of Memon where females were dominant with a female-male ratio of1.2:1.[11,12] The explanation for male predominance in our set up could be that females have less access to health care facilities due to social taboo. We studied patients with otogenic complications having age ranges from 21-76 years with mean age of 48.5±3.5 years, which is not in agreement with the report of Yagizy where patients ages ranged from 9-74 years with mean age of 31.3 years.[13] In this study the majority of patients (45.45%) presented in the second and third decade of life which is comparable to the study of Vikram who found the majority of patients were younger with male predominance.[14] T he c omplications of CSOM have a predilection for younger-aged people probably due to their immature immune system and these people are more negligent about self care. In this study 26 patients (59.1%) had lower socio-economic status which simulates the finding of Islam where complications of CSOM were common in rural populations with low socio-economic status, poor nutrition and bathe in river or pond water.[15] Similarly Vikram also experienced that rural and illiterate patients had a higher risk of developing complications.[14] In the current study there was mild to moderate hearing loss in 36 patients (77.27%), while severe to profound hearing loss was recorded in eight patients (18.18%), in accordance with the study of Magsi who observed that six patients (10%) had a severe degree of hearing impairment, while 45 patients (75%) and nine patients (15%) had moderate and mild degrees of hearing impairment respectively.[16] The presentations of these patients were discharging ears in all cases (100%) and the commonest otoscopic finding was atticoantral perforation in the drum (93.18%). Similarly Matanda et al.[17] found that otorrhea and hearing loss were the major presenting symptoms. However clinical features of this study are at variance with Ceylan's study having otorrhea 44.3%, headache 20.6% and

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postauricular swelling 10.3%.[18] The complications of CSOM can be managed by treating the complication first followed by treating the primary source of infection surgically. In the current study a postaural approach was adopted in all patients (100%) and mainly canal wall down mastoidectomy (79.5%) was carried out while in seven patients (15.9%) modified radical mastoidectomy and in two patients (4.5%) tympanoplasty was performed, simulating the results of Magsi who performed canal wall down mastoidectomy in 45 (75%) cases.[16] Likewise Khan carried outcanal wall down mastoidectomy in 23 patients (65.71%), modified radical mastoidectomy in seven patients (20%) and atticotomy in three patients (8.57%).[19] Our results regarding surgical procedures for CSOM differ from those of Sangupta who performed canal wall down mastoidectomy in 25 patients (62.5%), atticotomy in five cases (12.5%) and tympanoplasty in seven cases (17.5%).[20] The explanation may be that Sangupta studied cases with limited disease. Otogenic intracranial abscess was primarily treated by neurosurgeons with procedures like bur-hole aspiration (45.4%) and craniotomy (25%). Similarly Sarmast conducted a study on 47 patients with intracranial abscess and 29 patients (61.7%) were treated with bur-hole aspiration, wherein seven patients needed second aspiration while 18 patients (38.3%) were treated with craniotomy. The treatment procedures for intracranial abscess in this study were also similar to those of Tan, who performed craniotomy in 28 patients (54.9%) and bur-hole aspiration in 23 patients (45.1%) for intracranial abscess. The neurosurgical techniques adopted in this study differ from Gadgil who treated a total of 33 patients with intracranial abscess-- 22 patients (67%) with craniotomy, nine patients (27%) with open aspiration and two (6%) with bur-hole aspiration, and six patients (18%) with repeat surgical procedures for abscess recurrence.Operative findings in this study were cholesteatoma in 44 patients (100%), granulation tissue in 37 patients (84.1%), ossicular damage in 21 patients (47.7%) and dehiscent facial nerve in seven patients (15.9%). Similarly operative findings of this study are also consistent with results of Magsi.[16] The operative findings of this study are also consistent with results of Islam who found cholesteatoma in 76% and granulation tissue in 23% cases.[15] However our operative findings were not in accordance with Memon's where cholesteatoma was found in 45 patients (11.5%), ossicular damage in 45 patients (11.5%), and exposed facial nerve in six patients

(1.53%).[12] Chronic suppurative otitis media can give rise to intracranial and extracranial complications depending upon the severity of infection. We observed that the most common extracranial complication was subperiosteal abscesses (38.63%) while the most common intracranial complication was extradural abscess (22.72%). Our findings are in agreement with Dubey's study that revealed commonly encountered intracranial complications were otitic meningitis, lateral sinus thrombosis, and cerebellar abscess, which were seen in 13 (19%), 10 (14%), and six (9%) cases, respectively. The extracranial complications were mastoid abscess, postauricular fistula, and facial palsy 37%, 24% and 14% respectively.

Likewise Yagizy reported that meningitis was the most common (n=15, 35.7%) intracranial complication of CSOM followed by brain abscess (n=14, 33.3%) and lateral sinus thrombosis (n=10, 23.8%).[13] Our results vary from findings of Ceylan who noted that labyrinthitis was the most common extracranial complication (44.3%) followed by facial palsy (35%), mastoid abscess (11.3%), postauricular fistula (7.3%), and Bezold's abscess (2.1%).[18] The complications of CSOM in this study also differ from those of Adoga where complications of CSOM were mastoid abscess (6.8%), subperiosteal abscess (1.4%), meningitis (1.4%) and facial nerve paralysis (1.4%). However we cannot establish the explanation for this difference. Our overall mortality of 4.5% is higher than Mostafa's and Yagizy's mortality of 1.42% and 2.4% respectively.

Conclusion

Complications of CSOM commonly affect the younger age group with low socioeconomic status. Both intracranial and extracranial complications are frequently encountered in our setting. Complications can be prevented if CSOM is treated in time with appropriate medications or meticulous surgery. These complications can be managed successfully with the collaboration of a neurosurgeon if diagnosed promptly and appropriately.

References

1. Aldakhail AA. Chronic suppurative otitis media with intracranial complication. Neurosciences 2006;11:322-5.

2. Lin YS, Lin LC, Lee FP and Lee KJ. The prevalence of chronic otitis media and its complication rates in teenagers and adult patients. Otolaryngol-Head Neck Surg 2009;140:165-70.

3. Singh M, Jain S, Rajput R, Khatua RK, Sharma D. Retrospective and prospective study of Singapore swing method on healing of mastoid cavity. Indian J Otolaryngol Head Neck Surg 2010;62:365-71.

4. Lasisi AO, Olaniyan FA, Muibi SA, Azeez IA, Abdulwasiu KG, Lasisi TJ, et al. Clinical and demographic risk factors associated with chronic suppurative otitis media. Int J Paediatr Otorhinolaryngol 2007;71:1549-54.

5. O'Connor TE, Perry CF, Lannigan FJ. Complications of otitis media in Indigenous and non-Indigenous children. Med J Aust 2009;191:60-4.

6. Skotnicka B. Complications of otitis media in children in the era of antibioticotherapy. Otolaryngol Pol 2007;61:779-83.

7. Yorgancılar E, Yildirim M, Gun R, Bakir S, Tekin R, Gocmez C, et al. Complications of chronic suppurative otitis media: a retrospective review. Eur Arch Otorhinolaryngol 2013;270:69-76.

8. Hossain MM, Kundu SC, Haque MR, Shamsuzzaman AK, Khan MK, Halder KK. Extracranial complications of chronic suppurative otitis media. Mymensingh Med J 2006;15:4-9.

9. Wu JF, Jin Z, Yang JM, Liu YH, Duan M. Extracranial and intracranial complications of otitis media: 22-year clinical experience and analysis. Acta Otolaryngol 2012;132:261-5.

10. Morris PS, Richmond P, Lehmann D, Leach AJ, Gunasekera H, Coates HL. New horizons: otitis media research in Australia. Med J Aust 2009;191:S73-7.

11. Baig MM, Ajmal M, Saeed I, Fatima S. Prevalence of cholesteatoma and its complications in patients of chronic suppurative otitis media. J Rawalpindi Med Coll 2011;15:16-17.

12. Memon MA, Thaheem K, Marfani MS. Frequency and complications of cholesteatoma in cases of chronic suppurative otitis media. Pak J Otolaryngol 2005;21:48-9.

13. Yagizy R, Adali MK, Abdullah TAS, Uzun C, Koten M, Karasalihoglu A. Intracranial complications of chronicsuppurative otitis media. Trakya Univ Tip Fak Derg 2008;25:196-203.

14. Vikram BK, Khaja N, Udayashankar SG. Clinicoepidemiological study of complicated and uncomplicated chronic suppurative otitis media. J Laryngol Otol 2008;122:442-6.

15. Islam MR, Taous A, Hossain MM, Ekramuddaula AFM, Islam MS. Comparative study of tubotympanic and atticoantral variety of Chronic suppurative otitis media. Bangladesh J Otorhinolaryngol 2010;16:113-9.

16. Magsi PB, Jamro B, Sangi HA. Clinical presentation and outcome of mastoidectomy in chronic suppurative otitis media (CSOM) at tertiary care hospital, Sukkur, Pakistan. Rawal Med J 2012;37:50-3.

17. Matanda RN, Muyunga KC, Sabue MJ, Creten W, Van de Heyning P. Chronic suppurative otitis media and related complications at the University Clinic of Kinshasa. B-ENT 2005;1:57-62.

18. Ceylan A, Bayazit Y, Yilmaz M, Celenk F, Bayramoglu I, Uygur K, et al. Extracranial complications of chronic otitis media. Int Adv Otol 2009;5:51-5.

19. Khan A, Khan MI, Muhammad. Intracranial complications of chronic suppurative otitis media: clinical presentation and outcome of surgical procedures. Gomal J Med Sci 2012;10:186-9.

20. Sengupta A, Anwar T, Ghosh D, Basak B. A study of surgical management of chronic suppurative otitis media with cholesteatoma and its outcome. Indian J Otolaryngol Head Neck Surg 2010;62:171-6.

Study of Non-Alcoholic Fatty Liver Disease in Maharashtra Population

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Abstract

Background: NAFLD has become most prevalent cause of liver disease globally. Non-alcoholic steatohepatitis and fibrosis causes increased risk of cardio vascular and liver related deaths.

Method: Patients aged between 25 to 65 were studied. USG, lipid profile, BMI, HbA_1C, routine blood exam. Blood pressure was recorded by sphignomanometer; ECG was recorded if necessary to rule out the grades of NAFLD with CV diseases.

Results: 19 (21.2%) grade-I, 40 (44.4%) grade-II, 31 (34.4%) grade-III, NAFLD. 54 (60%) had BMI, 22.8 to 23.2 36 (40%) had BMI, 36 (40%) 23.3 to 24.2, 55 (61.1%) were Diabetic, 67 (74.4%) were Hypertensive, 66 (73.3%) were hyperlipidemic, 25 (27.7%) had IHD, 5 (5.5%) had MI, All patients had significant biochemical profile.

Conclusion: Evaluating the grades of NAFLD by radiological with biochemical laboratory techniques have greater significance to avoid morbidity and mortality to patients of NAFLD without liver biopsy.

Keywords: NAFLD, USG, Biochemical, BMI, NASH

Introduction

Non-Alcoholic Fatty liver disease (NAFLD) encompasses a spectrum of disease ranging from simple steatosis to inflammatory steatohepatitis (NASH) with increasing levels of fibrosis and ultimately cirrhosis [1]. NAFLD is closely associated with obesity and insulin resistance and now it is reported that NAFLD represent hepatic manifestation of metabolic syndrome [2]. Prevalence of NAFLD is closed associated with obesity and diabetes and most common cause of liver disease globally [3][4].

Prevalence of NAFLD is estimated to be between 20% to 30% and 90% in obese globally. It is also observed that, just simple steastosis, with no inflammation or fibrosis is associated with liver related mortality. Hence attempt is made to evaluate the MI and various clinical manifestation with biochemical analysis to correlate the NAFLD so that, types and grades of NAFLD can be differentiated to avoid worse clinical outcome [5].

Material and Method

90 (Ninety) patients regularly visited to Medicine department of JUIUS Indian Institute of Medical Science and research Warudi, Badnapur (Tq), Jalna

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(dist) Maharashtra-431202 hospital were studied.

Inclusive Criteria: Patients aged between 20 to 65 years having the symptoms of hepatic steatosis, cirrhosis of liver with Diabetic mellitus were selected for study.

Exclusion Criteria: Alcoholic, haematchromatosis, hydatid cyst presence of HBSAg, HIV positive were excluded from the study.

Method

USG, routine blood examination, lipid profile HbA1C, BMI profile carried out in every patient. Concerned previous history was also recorded from every patient. ECG was recorded in patient (if required). Blood pressure was recorded from spignomanometre.

Duration of study was from October-2021 to June-2022

Statistical analysis: Grades of fatty liver, various clinical manifestations, Bio-chemical profile was classified with percentage. The statistical analysis was carried out in SPSS software. The ratio of male and female was 2:1.

Observation and Results

Table-1: Study of grades of NAFLD 19 (21.1%) had grade-I, 40 (44.4%) had grade-II, 31 (34.4%) had grade-III.

Table-2: Clinical manifestations of NAFLD

- Body Mass Index – (a) 54 (60%) had 22.8 to 23.2, (b) 36 (40%) had 23.3 to 24.2
- Diabetes Mellitus status – 33 (38.8%) were pre-diabetic, 55 (61.1%) were diabetic
- Status of Blood pressure – 23 (25.5%) were Norma tensive, 67 (74.4%) were hypertensive
- 66 (73.3%) were hyper-lipidemic
- 25 (27.7%) had IHD
- 5 (5.55%) had MI

Table-3: Biochemical profile in NAFLD – Mean value of total cholesterol 255 (± 7.2%), Mean value of Triglyceride 250 (± 11.2%), Mean value of HDL 43.2 (± 2.6), Mean value of LDL 129 (± 12.6), Mean value of AST was 53.4 (±3.2), Mean value ALT was 65.3 (± 5.4), Mean value of ALP was 10.5 (± 10.4%), Mean value of Sr. Albumin 3.48 (±0.11), Mean value of Total Bilurubin, 0.91 (±0.8), Mean value of BS 132 (11.2%), Mean value of HbA1c 9.10 (± 3.2).

Discussion

Present study of NAFLD in Maharashtra Population has 19 (21.1%) grade-I fatty liver, 40 (44.4%) grade-II fatty liver, 31 (34.4%) grade-III fatty liver (table-1). 54 (60%) had 22.8 to 23.2 BMI, 36 (40%) had 23.3 to 24.2 BMI, 55 (61.1%) type-II D M patients, 67 (74.4%) were hypertensive, 66 (73.3%) were hyperlipidemic 25 (27.7%) had IHD, 5 (5.55%) had MI (Table-2). Bio-chemical profile of NAFLD had 22.5 (±72), total cholesterol 250 (±11.2) Triglyceride, 43.2 (±2.6) HDL, 129 (±12.6) LDL, 53.4 (±3.2) AST, 65.3 (±5.4) ALT, 105 (±10.4) ALP, 3.48 (± 0.11) serum albumin, 0.91 (± 0.8), Total Bilurubin 132 (± 11.2) Fasting blood sugar, 9.10 (±3.2) HbA$_1$C (Table-3). These findings are more or less in agreement with previous studies[6][7][8].

NAFLD is associated with metabolic syndrome, which is characterised by insulin resistance, HTN, Cholesterol abnormality, increased risk of blood clotting, type-II DM, obesity, elevated serum triglyceride, and reduced HDL which has greater risk of heart diseases, stroke and liver related diseases [9]. Although, the exact cause of NAFLD is still unclear but it is associated with variations in lipid metabolism. It is also reported that NAFLD is the common cause of chronic liver diseases or chronic viral hepatitis [10]. Histological spectrum of NAFLD has no pathological changes which can definitively distinguish NAFLD from alcoholic liver diseases thus accurate alcohol history is essential to alcoholic liver disease.

Insulin resistance factor is believed to be a significant role that leads to increased lipolysis in peripheral adipose tissue and increased uptake of fatty acids by hepatocytes. The end result is an increase in fatty acids and triglycerides in the hepatocytes leading to steastosis. Hence insulin resistance is almost universal factor in patients with NAFLD and is related to an imbalance between pro-insulin (adiponectin) and anti-insulin cytokine (TNF-α)[11].

It is also reported that, high prevalence of

NAFLD, is due to rapid industrialisation, sedentary life-style, obesity-DM, and junk-food intake in developing countries.

Summary and Conclusion

Present study of NAFLD is associated with obesity, diabetes and metabolic syndrome which is the major cause of morbidity and mortality because simple steatosis carries benign prognosis but in majority of cases will have hepato-cellular carcinoma. Although liver biopsy remains gold standard for disease assessment the development of risk scores, bio-marker panels but this demands further patho-physiological, genetic, nutritional, environmental, hormonal studies because exact pathogenesis of NAFLD is still unclear.

Limitation of study – Due to tertiary location of research centre, small number of patients and lack of latest techniques we have limited findings and results.

- This research paper is approved by Ethical committee of JIIUS Indian Institute of Medical Science and research Warudi, Tq-Badnapur, Dist- Jalna Maharashtra – 431202
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Table 1: Study of grades of Non-Alcoholic Fatty liver Disease

Sl. No	Grades of NAFLD	No. of patients (90)	Percentage (%)
1	Grade-I	19	21.1
2	Grade-II	40	44.4
3	Grade-III	31	34.4

Table 2: Clinical manifestations of Non-Alcoholic fatty liver Disease (NAFLD)

Sl. No	Clinical Manifestation	No. of Patients	Percentage (%)
1	Body Mass Index a-22.8 to 23.2	54	60
	b-23.3 to 24.2	36	40
2	Status of Diabetes Mellitus a – Pre-diabetic	35	38.8
	b – Diabetic	55	61.1
3	Status of Blood Pressure a – Norma tensive	23	25.5
	b – Hyper tensive	67	74.4
4	Hyper-lipidemic	66	73.3
5	Ischemic Heart Disease (IHD)	25	27.7
6	MI	05	5.55

Table 3: Biochemical profile of Non-Alcoholic Fatty liver Disease patients

Sl. No	Biochemical profile	Mean Value (±SD)
1	Total Cholestrol	225 (± 7.2)
2	Triglyceride	250 (± 11.2)
3	HDL	43.2 (± 2.6)
4	LDL	129 (±12.6)
5	AST	53.4 (± 3.2)
6	ALT	65.3 (±5.4)
7	ALP	10.5 (±10.4)
8	Serum Albumin	3.48 (±0.11)
9	Total Biliurubin	0.91 (±0.8)
10	Fasting Blood Sugar	132 (±11.2)
11	HA1C	9.10 (±3.2)

ALP = Alkaline Phosphatise

ALT = Alanine amino

LDL = Low Density Lipoprotein Transfarase

AST = Aspirate Amino transfarase lipoprotein

HbA1C = Haemoglobin Aic

References

1. Ludwig J, Viggiano TR, Non-alcoholic steatohepatatis Mayo Clinic experiences with a hitherto un-named disease Mayo Clin. Proc. 1980, 55; 434-8.

2. Vuppalanchi R, Chalasani N – Non-alcoholic Fatty liver disease and non-alcoholic steatohepatatis J hepatology 2008, 48, suppli, 104-12.

3. Petta S, Muratore C – Non-alcoholic fatty liver disease pathogenesis the present and future Dig. Liver Dis. 2009, 41; 615-25.

4. Dowman JK, Tomlison JW – pathogenesis of non-alcoholic fatty liver disease QJM 2010, 103; 71-83.

5. Gupta P, Amarapurkar D – Non-alcoholic fatty liver disease in type-II Diabetes mellitus J. of Gastroenterology and hepatology 2004, 19 (8); 854-858.

6. Agarwal SR, Mathetra V, Sakhuja P – Clinical, Bio-chemical and histological profile of non-alcoholic steatohepatatis Ind. J. of Gastroenterology 2001, 20; 183-6.

7. Day CP – From fat to inflame mat on J. of Gastro entomology 2006, 130; 207-10

8. Browning JD – Prevalence of hepatic streatosis in urban population in United States J. Herpetology 2004, 40; 1389-95.

9. Ajay Duseja – Non-alcoholic fatty liver in India, a lot done yet more required Ind. J. Gastroenterol. 2010, 29; 217-225.

10. Bajaj S – A case control study on insulin resistance metabolic co-varieties and prediction score in non-alcoholic fatty liver disease J. He-pathology 2004, 40; 1389-95.

11. Deepak – Non-alcoholic fatty liver disease International J. of biological and medical research 2012, 33 (5); 39-42.

Fine Needle Aspiration Cytology in Effective Management of Patients with Granulomatous Inflammation in Neoplastic and NonNeoplastic Lesions

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Abstract

Background and Aim: Fine Needle Aspiration Cytology (FNAC) plays an important role in the diagnosis of tuberculous inflammation and prevents unnecessary surgery. Cytodiagnosis of tuberculosis depends on the demonstration of epithelioid cell granuloma and caseous necrosis with or without Langhans type of giant cells. Present study was done to assess the usefulness of the cytological study in the diagnosis of granulomatous lesions.

Material and Methods: The present study was carried at the department of Pathology at tertiary care hospital over 12 months. Patients fulfilling inclusion criteria will be selected from fine needle aspiration cytology specimens after written consent. A routine stain like Hematoxylin and eosin (H&E), Papanicolaou (PAP) and Giemsa stain will be done. Two extra unstained slides will be smeared from aspiration material.

Results: Total 200 patients with granulomatous inflammation diagnosed on FNAC were taken. Among 200 cases, single swelling was present in 160 cases and multiple swellings were present in 40 cases. Out of which cervical was the commonest site. On FNAC, the nature of aspirate was blood mixed in 123 cases followed by aspiration of pus and cheesy material in 52 and 25 cases respectively. In the present study of 200 cases of granulomatous inflammation on FNAC, tuberculosis was the most common finding in 140 cases (70%). There was an association between AFB positivity and caseation necrosis.

Conclusion: FNAC is still a good diagnostic tool in the evaluation of granulomatous lesions. Patients who are not responding to empirical AKT should be considered for other causes of granulomatous inflammation other than TB, and proper workup should be done.

Key Words: Fine Needle Aspiration Cytology, Granulomatous lesions, Hematoxylin, Tuberculosis

Introduction

Needle aspiration had a fleeting course during 1930s, first reported by Hayes Martin for management of head & neck malignancies but it re-emerged as Fine Needle Aspiration Cytology in 1970s. With vital structures situated in head and neck region, complete excision biopsy would later lead to mortality and therapeutic biopsy of any malignant mass would later lead to its invasion into deeper tissue, hence these procedure were often fatal.[1,2] In case of Fine Needle Aspiration Cytology, skin track may be

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created by needle but there is no proof till now that it may lead to invasion.[3] With advent of Fine Needle Aspiration Cytology which reduced trauma and had other benefits due to its simple technique was often employed.

Granulomatous inflammation is a distinctive form of chronic inflammation produced in response to various infectious, autoimmune, toxic, allergic, and neoplastic conditions.[4] Infectious causes most notably presenting with granuloma are tuberculosis and fungal infections. It is characterized by the formation of distinct granulomas composed of aggregates of epithelioid histiocytes, with a peripheral cuff of lymphocytes and plasma cells, and occasionally a necrotic centre. The clinical value of FNAC is not only in neoplastic conditions but also important in the diagnosis of non-neoplastic conditions. Tuberculosis is the foremost infectious cause of mortality worldwide with 2-3 million deaths being reported each year and accounts for over a quarter of all avoidable deaths globally.[5]

Fine Needle Aspiration Cytology is generally confused with Fine Needle Aspiration Biopsy (FNAB), because biopsy is in general regarded as a procedure of removing tissue fragment and processing it for histopathological assay. Fine Needle Aspiration Biopsy is done with large gauge 14 Silverman or Tru-Cut needle which yields us more amount of tissue, but procedure causes injury and local trauma. The process for cytological diagnosis is called as aspiration cytology. Aspiration cytology acts as a preliminary tool for wide options of diagnoses but it can be confirmed by biopsy of tissue or specimen. Nowadays Fine Needle Aspiration Cytology is routinely done as first line investigation procedure for rapid diagnosis. Aspiration cytology acts as a preliminary tool for wide range of diagnosis and can be confirmed by biopsy.[6]

The diagnosis of tuberculosis remains a challenge.[7] History, clinical examination and many diagnostic tests are helpful. Every test has its sensitivity, specificity and limitations. The commonly performed tests include examination of sputum for Acid Fast Bacilli, Cultures for Mycobacterium tuberculosis, Fine Needle Aspiration Cytology (FNAC), Biopsy, and PCR.[6] FNAC plays an important role in the diagnosis of tuberculous inflammation and prevents

unnecessary surgery.[7] Cytodiagnosis of tuberculosis depends on the demonstration of epithelioid cell granuloma and caseous necrosis with or without Langhans type of giant cells. Bacteriological confirmation is required by Ziehl Neelsen (ZN) stain/culture for acid-fast bacilli (AFB). Treatment of tuberculosis can be straightway started after FNAC diagnosis by correlation with clinical findings and other investigations. Granulomatous inflammation is not diagnostic of TB. Others causes must be ruled out before giving antituberculous treatment (AKT). Good clinical history, a close cytological examination and a clinicopathological correlation are essential in making a final diagnosis. Some solid tumours and malignant lymphomas which are associated with epithelioid granulomas are widely observed in FNAC cytosmear and they are underdiagnosed sometimes. Granulomatous inflammation found in lymph nodes draining carcinomas is a recognised phenomenon.[9,10] These cases with granulomas can lead to diagnostic difficulties. So, the cytological differential diagnosis of a granulomatous lesion should include malignant neoplasms also. Present study was done to assess the usefulness of the cytological study in the diagnosis of granulomatous lesions.

Material and Methods

The present study was carried at the department of Pathology at tertiary care hospital over 12 months. The sample size was taken based on the convenience of the study.

Inclusion criteria: Cases diagnosed as granulomatous inflammation on FNAC

Exclusion criteria: Acellular smears/smears with crushed morphology or poorly stained slides will be excluded. Previously diagnosed cases and cases already taking AKT

Patients fulfilling inclusion criteria will be selected from fine needle aspiration cytology specimens after written consent. A routine stain like Hematoxylin and eosin (H&E), Papanicolaou (PAP) and Giemsa stain will be done. Two extra unstained slides will be smeared from aspiration material. One slide will be stained by Ziehl Nelson's (ZN) stain. The second slide will be stained with Periodic Acid Schiff stain (PAS).

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Statistical analysis

The recorded data was compiled and entered in a spreadsheet computer program (Microsoft Excel 2007) and then exported to data editor page of SPSS version 15 (SPSS Inc., Chicago, Illinois, USA). For all tests, confidence level and level of significance were set at 95% and 5% respectively.

Results

Total 200 patients with granulomatous inflammation diagnosed on FNAC were taken. Granulomas were described as comprising of pale staining epithelioid cells which were round to oval to spindle against an eosinophilic background.

As shown in Table-1, a slight female preponderance was observed. The male to female ratio was 1.0 to 1.4. In this study the age of cases ranged from 2 months to 80 years. The maximum incidence was in the age group of 31 to 40 years.

In the present study of 200 cases, 50 cases had a history of smoking, 11 cases had a history of tobacco and 9 cases had a history of both tobacco and smoking. while 130 cases are devoid of any habits. Out of the total of 50 cases with smoking, 45 (90%) cases were of tuberculosis, 2 case of fungal infection, 1 case of SCC, 1 case of metastatic SCC and 1 case was labelled as granulomatous inflammation. Among 200 cases, single swelling was present in 160 cases and multiple swellings were present in 40 cases. Out of which cervical was the commonest site. On FNAC, the nature of aspirate was blood mixed in 123 cases followed by aspiration of pus and cheesy material in 52 and 25 cases respectively.

Table-2: dictates Cytomorphological diagnosis in the present study of 200 cases of granulomatous inflammation on FNAC, tuberculosis was the most common finding in 140 cases (70%).

As shown in Table 3, the ZN stain for acid-fast bacilli was positive in 135 cases and negative in 65 cases. Granulomatous inflammation with positive ZN stain was diagnosed as tuberculosis. PAS stain for fungus was positive in 8 cases. Out of a total of 200 cases, caseation present in 125 cases and absent in 75 cases. Total 125 cases with caseation, 120 cases were of tuberculosis and 5 case of fungal infection. There was

an association between AFB positivity and caseation necrosis. We have found 120 cases with caseation out of a total of 135 AFB positive cases, while only 5 cases were found without caseation. (Table 4)

Table 1: Gender wise Distribution of Study Participants

Gender	Number	Percentage (%)
Male	80	40
Female	120	60
Total	200	100

Table 2: Cytomorphological categorization of cause of granulomatous inflammation

Cytological Diagnosis	Number	Percentage (%)
HL	1	0.5
Leprosy	2	1
Micro Filaria	1	0.5
NHL	1	0.5
SCC	2	1
De Quervain's thyroiditis	1	0.5
Granulomatous Inflammation	40	20
Tuberculosis	140	70
Granulomatous sialadenitis	1	0.5
Metastatic Carcinoma	2	1
Fungal Infection	8	4
Sarcoidosis	1	0.5
Total	200	100

Table 3: Result on ZN stain

ZN Stain	Number	Percentage (%)
Positive	135	67.5
Negative	65	32.5
Total	200	100

Table 4: Correlation of caseation with ZN stain

ZN Stain	Caseation		
	Absent	Present	Total
Positive	15	120	135
Negative	60	5	65
Total	75	125	100

Discussion

Fine Needle Aspiration Cytology is a valuable diagnostic as well as useful therapeutic test. Sometimes Fine Needle Aspiration Cytology may give false-negative and false-positive results, so in every circumstance, we should interpret Fine Needle Aspiration Cytology report with the entire clinical scenario. Granulomas are most commonly found in routine practice which is characterized by the formation of distinct granulomas composed of aggregates of epithelioid histiocytes, with a peripheral cuff of lymphocytes and plasma cells, and occasionally a necrotic centre. To treat these lesions, demonstration of the etiological agent for definitive diagnosis is essential, which will help inpatient management and outcome.[11]

Fine Needle Aspiration Cytology is sometimes confused with Fine Needle Aspiration Biopsy, because biopsy is regarded as a procedure of removing the tissue fragment. Fine Needle Aspiration Biopsy yields more amount of tissue but causes more injury and local trauma.[12] Two basic things requiring for reporting cytology report perfectly: 1) high quality of preparation and 2) representative sample. If these two requirements are not going to be fulfilled no matter how carefully Fine Needle Aspiration Cytology is done remains unimportant.[13] The diagnosis of TB is confirmed by isolating M. tuberculosis or by finding specific DNA sequences in aspirates. Fine needle aspiration cytology is an inexpensive, less invasive procedure for early diagnosis of such tuberculosis and timely initiation of a specific therapy.[14] FNAC plays an important role in the diagnosis of tuberculous inflammation and prevents unnecessary surgery. Cytodiagnosis of tuberculosis depends on the demonstration of epithelioid cell granuloma and caseous necrosis with or without Langhans type of giant cells. Bacteriological confirmation is required by Ziehl Neelsen (ZN) stain/culture for acid-fast bacilli (AFB). Treatment of tuberculosis can be straightway /started after FNAC diagnosis by correlation with clinical findings and other investigations.

Most of the patients were in the age group of 31 to 40. The least affected age groups were between 61 to 70 years. Ergete and Bekele.[15.] observed a similar finding in their study. Similar results were found in the study of Permi HS et al and Pawale JS et al.[16,17]

The higher incidence of disease among females may be due to the low immunity of Indian females, particularly those belonging to low socio-economic strata and those in the reproductive age group. Paliwal et al and Khajuria et al also noted the female preponderance in their studies.[17,18] The commonest groups of swellings aspirated in the present study were the cervical group. This study was also consistent with other studies in terms of cervical involvement (69.96%) as the most common anatomic site of granulomatous inflammation.[19] The most common cause of granuloma in this study was tuberculosis, which is in concordance with findings of another study of Permi HS et al and Pawale JS et al.[16,17]

Other infectious causes of granulomatous inflammation found in this study were leprosy, granulomatous sialadenitis, microfilaria and De Quervain's thyroiditis.[19-22] Non-infectious causes of granuloma found in the present study are Hodgkin lymphoma, non-Hodgkin lymphoma, squamous cell carcinoma and metastatic carcinoma. Sehgal et al observed in their study that granulomas can be seen in draining lymph nodes of patients with malignancy and in both Hodgkin's disease and non-Hodgkin's lymphoma.[23] Sometimes, cytological findings of granulomas in carcinoma and lymphoma obscure primary malignancy and may favour the underdiagnosis of such cases as infectious etiologies. For appropriate and timely management of these cases, proper identification of the cause of granulomatous inflammation is mandatory. Many mechanisms have been described for the formation of granulomas in malignancies. Antigens, most likely derived from tumour cells, could elicit a hypersensitivity reaction mediated by T-helper cells and thereby stimulate the activation of monocytes to form epithelioid histiocytes.[24]

In the present study of 200 cases of granulomatous inflammation, 135 cases showed positivity for acid-fast bacilli. This finding is agreed with Krishnaswamy H et al.[20] Whereas it is 44% in the study of Mudassar et al, 45.8% in the study of Das et al and 59.4% in the study of Bezabih et al.[25-27]

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Conclusion

Even after highly effective anti-tubercular treatment, tuberculosis remains the leading cause of granulomatous lesions. FNAC is still a good diagnostic tool in the evaluation of granulomatous lesions. Patients who are not responding to empirical AKT should be considered for other causes of granulomatous inflammation other than TB, and proper workup should be done.

Ethical approval was taken from the institutional ethical committee and written

Informed consent was taken from all the participants.

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Conflict of Interest: None declared

References

1. Martin HE, Ellis EB. Biopsy of needle puncture and aspiration. Ann Surg 1930;92(2):169-81.

2. Zajicek J, Eneroth CM. Cytological diagnosis of salivarygland carcinomata from aspiration biopsy smears. Acta Otolaryngologica Suppl 1969;263:183-5.

3. Russel RCG, William NS, Bulstrode CJK. Bailey and Love's short practice of surgery. 24th edn. Taylor & Francis Ltd 2004.

4. Shah KK, Pritt BS, Alexander MP. Histopathologic review of granulomatous inflammation. J Clin Tuberc Other Mycobact Dis. 2017 Feb 10;7;1-12. doi: 10.1016/j. jctube. 2017.02.001 [Crossref][PubMed][Google Scholar]

5. World Health Organization (WHO). "Tuberculosis Fact Global and Regional Incidence". WHO. 1992;Sheet No. 104-2006.

6. Mittal P, Handa U, Mohan H, Gupta V. Comparative evaluation of fine needle aspiration cytology, culture, and PCR in diagnosis of tuberculous lymphadenitis. Diagn Cytopathol. 2011 Nov;39(11)822-6.

7. Singh S, Dey B, Sachdeva KS, Kabra SK, Chopra KK, Chaudhary VK, Sharma P, Katoch VM. Challenges in tuberculosis diagnosis and management-recommendations of the expert panel. J Lab Physicians. 2015 Jan-Jun;7(1)1-3. doi: 10.4103/0974-2727.154778

8. Nur, Tamanna E, Afroz Shirin, and Moni Mohan Saha. "Diagnostic Accuracy of Fine Needle Aspiration Cytology in Diagnosis of Tuberculous Lymphadenitis. " J Enam Medi Col. 2019;9(1)30-33.

9. Gregorie hb, othersen hb, moore mp. The significance of sarcoid-like lesions in association with malignant neoplasms. Am J Surg. 1962 Oct;104;577-86. doi: 10.1016/0002- 9610(62)90399-9. PMID: 13901642 [Crossref] [PubMed][Google Scholar]

10. Oberman HA. Invasive carcinoma of the breast with granulomatous response. Am J Clin Pathol. 1987 Dec;88(6)718-21. doi: 10.1093/ajcp/88.6.718

11. National tuberculosis centre. Annual report of national tuberculosis control progrmme. Ministry of Health, Kathmandu, Nepal. 2015/2016

12. Watkinson JC, Wilson JA, Gaze M, et al. Stell and Maran's Head and neck surgery. Chap- 2. 4th edn. Oxford: Butterworth-Heinemann 2000:20-1.

13. Ponder TB, Smith D, Ramzy I. Lymphadenopathy in children and adolescents: role of fine-needle aspiration in management. Cancer Detect Prev 2000;24(3):228-33.

14. Narayana Reddy RA, Narayana SM, Shariff S. Role of fine-needle aspiration cytology and fluid cytology in extra-pulmonary tuberculosis. Diagn Cytopathol. 2013 May;41(5)392-8. doi: 10.1002/dc.22827

15. Ergete, Wondwossen, and Alemayehu Bekele. "Acid fast bacilli in aspiration smears from tuberculous patients. " Ethiopian Journal of Health Development. 2000;14(1)99-104. [Crossref] [PubMed][Google Scholar]

16. Permi H S, Padma S K, Teerthanath S, Mathias M, Kumar S, HL K P. A histopathological study of granulomatous inflammation. Journal of Health and Allied Sciences NU. 2012;2(01)15-19. [Crossref] [PubMed][Google Scholar]

17. Pawale, Jayashree, Rekha Puranik, M H Kulkarni. "A histopathological study of granulomatous inflammations with an attempt to find the aetiology. " J Clin Diagn Res. 2011;5(2)301-6. [Crossref] [PubMed] [Google Scholar]

18. Nidhi P, Sapna T, Shalini M, Kumud G. FNAC in tuberculous lymphadenitis- experience from a tertiary level referral centre. Indian J Tuberc. 2011 Jul;58(3)102-7. [Crossref][PubMed][Google Scholar]

19. Khajuria, R, Goswami K C, Singh K, Dubey V K. Pattern of lymphadenopathy on fine needle aspiration cytology in Jammu. JK Sci. 2006;8(3)157-159.

20. Sandhu VK, Sharma U, Singh N, Puri A. Cytological spectrum of salivary gland lesions and their correlation with epidemiological parameters. J Oral Maxillofac Pathol. 2017 May-Aug;21(2)203- 210. doi: 10.4103/ jomfp.JOMFP_61_17

21. Panicker N K, Buch AC, Vimal S, Dharwadkar AP. Cytological diagnosis of microfilariae in subcutaneous nodule. Medical Journal of Dr DY Patil University. 2012;5(1)71.

22. Dayal, Achaleshwar, and Karthikeyan Selvaraju. "Filariasis of the breast. " (2010).

23. Kushwah, Akanksha, Narendra Bhattarai, Ajay Koirala. "A histopathological study of granulomatous lesions. " Journal of Pathology of Nepal. 2018;8 (2)1341-1345.

24. Sehgal S, Goyal P, Ghosh S, Mittal D, Singh S. Malignancy and granulomatosis: causality or coincidence? Narrative systematic review. Iranian Journal of Pathology. 2014;9(4)237-244.

25. Khurana KK, Stanley MW, Powers CN, Pitman MB. Aspiration cytology of malignant neoplasms associated with granulomas and granuloma-like features-diagnostic dilemmas. Cancer. 1998 Apr 25;84(2)84-91.

26. Majeed MM, Bukhari MH. Evaluation for granulomatous inflammation on fine needle aspiration cytology using special stains. Patholog Res Int. 2011;851524. doi: 10.4061/2011/851524

27. Das DK, Pant CS, Pant JN, Sodhani P. Transthoracic (percutaneous) fine needle aspiration cytology diagnosis of pulmonary tuberculosis. Tuber Lung Dis. 1995 Feb;76(1)84-9. doi: 10.1016/0962- 8479(95)90586-3 [Crossref][PubMed][Google Scholar]

28. Bezabih M, Mariam DW, Selassie SG. Fine needle aspiration cytology of suspected tuberculous lymphadenitis. Cytopathology. 2002 Oct;13(5)284- 90. doi: 10.1046/j.1365-2303.2002.00418.x.

Etiology of Post-Covid Fungal Infections among Various Age Groups at Teritiary Care Hospital

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Abstract

Background: In patients with comorbid illnesses, COVID 19 disease is a severe acute respiratory syndrome that is linked to a variety of opportunistic bacterial and fungal infections. Finding the cause of fungal infections among post-covid patients in tertiary care hospitals is the aim of the study.

Objectives: To study the etiology of post-covid fungal infections among various age groups

Methods: Out of 578 samples (pus/tissue/biopsy) collected from patients attending Koti ENT hospital with complaints of pain in eye, cheek swelling, headache. All samples were subjected to direct KOH mount and inoculated on SDA, incubated for 1 week at 25°C.

Result: Out of 578 samples 214 are KOH positive and 291 are culture positive with fungi isolated – Mucor species, Aspergillus species and Candida species.

Conclusion: As post covid fungal infections are rapidly progressive and devascularised disease, timely diagnosis helps in effective management and treatment of patients.

Keywords: Mucormycosis, COVID-19, diabetic, KOH, SDA, fungi

Introduction

Coronavirus (COVID-19) causes a severe acute respiratory illness and is linked to a variety of opportunistic bacterial and fungal diseases.[1] Super infections caused by bacteria or fungi are a known risk factor for poor outcomes, particularly in individuals with co-morbid disorders. The two most common fungi causing co-infection in COVID-19 patients have been identified as Aspergillosis and Candida.[2] Recently, there have been an increasing number of instances of mucormycosis in patients with COVID-19 reported globally, particularly from India.[3]

Fungal infections associated with COVID-19 can cause serious morbidity and even mortality. The signs of several fungi infections, such as fever, coughing,

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and shortness of breath, might resemble those of COVID-19. Some people may simultaneously have COVID-19 and a fungus infection.[4]

A person has to undergo laboratory testing to identify whether they have COVID-19, a fungal infection, or both. Mucormycosis is an acute opportunistic ailment brought on by a number of fungus from the phylum Glomeromycota. Low oxygen (hypoxia), High glucose (diabetes, denovo-diabetes, and steroid-induced hyperglycemia), Acidic medium (metabolic acidosis, diabetic ketoacidosis [DKA]), and High iron levels are the primary factors that facilitate Mucorale spore germination in COVID-19 patients (increased ferritins). White blood cells' (WBC) decreased phagocytic activity as a result of immunosuppression (SARS-CoV-2 mediated, steroid-mediated or background comorbidities).[5] Hospitalization for an extended period of time, with or without artificial ventilation. Mucormycosis is a quickly developing devascularizing illness that can be fatal if not treated promptly.

Materials and Methods

Study Design: Cross sectional study

Study setting: Patients attending ENT government hospital, with clinical features suggestive of fungal infection after recovery from COVID 19 infection.

Study duration: The study would be conducted over a period of 3months.

Sample Size: Samples collected during the study period

The present cross sectional comparative study was carried out at Government ENT hospital, Koti, Hyderabad, Telangana from May 2021 to July 2021. All the patients with features of fungal infection who presented to the ENT hospital either, as an out-patient or following departmental referral were included in the study. A total of 578 samples were collected from patients admitted at the Government ENT hospital, with clinical features suggestive of fungal infection.

Inclusion Criteria:

- Patients of all age of both sex,
- Patient with history of covid -19,

- Patients on antivirals / steroids and
- Patients willing to give consent

Exclusion Criteria:

- Patients without H/O COVID- 19 and
- Patients not willing to give consent.

Both pre-operative and post-operative material was collected in sterile screw capped, leak proof universal containers with sterile normal saline. All the samples were examined by performing KOH wet mount and visualized under 10x and 40x for presence of any fungal elements and where then inoculated on Sabourads dextrose agar (SDA) and incubated for 48hs at 37°C for 5days.Any growth of SDA after 48hrs, Lactophenol cotton blue (LPCB) tease mount was made for further identification of morphology of fungus.

Statistical Analysis: The SPSS 22 software was used for statistical analysis. The data was presented in the form of means and percentages.

Observation and Results

Total number of sampled collected from patients admitted at Govt ENT Hospital are 578. Number of samples from Female Patients and Male Patients are 134 and 444 respectively. Mean Age is 47.4. Mean Age group for Female and male are 50.4 and 46.8 respectively.

Correlation between KOH and Culture

KOH+	Culture+	KOH -	Culture -
214	267	364	287

Organism Isolated in Culture

Total Culture positive Samples: 267

Organism	Total	KOH +	KOH -
Aspergillus Niger	12	7	5
Aspergillus Flavus	37	19	18
Aspergillus Fumigatous	3	1	2
Mucor	169	120	49
Rhizophus	27	18	9
Candida	19	14	5

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Age Distribution

Gender	Total Samples	Age Group	Patients associated	Percentage
Female	61	20-40	8	13.1
		41-60	46	75
		> 60	7	11.4
Male	199	20-40	58	29.14
		41-60	116	58.2
		> 60	24	12.0

POST OPERATIVE SAMPLES

Gender	Age Group	Patients associated	Patients with Comorbidities	Patients with Risk Factor	KOH +	KOH -	Culture +	Culture -	Organisms Isolated
Male	20-40	11	-	-	-	11	0	11	-
	41-60	15	-	-	-	15	-	15	
	> 60	2	-	-	-	2	-	2	
Female	20-40	4	-	-	-	4	-	4	-
	41-60	8	-	-	-	8	-	8	-
	> 60	1	-	-	-	1	-	1	-

Discussion

The etiologic agent of fungal infections is ubiquitous in nature and thus may easily be acquired. According to studies by Giri M. et al. (2021)[6] and Yin T., 9% and 17%, respectively, of COVID-19 patients were estimated to have diabetes mellitus (2021).[7] In this study, a 38 % prevalence of diabetic Miletus was estimated among COVID 19 patients.The majority of patients needed critical care, intubation, and ventilation due to severe COVID-19 pneumonia. The majority of patients also got steroids and had underlying diabetes mellitus. The only medicine that has currently been proven to be indisputably successful in the treatment of COVID-19 in clinical studies is corticosteroids. Systemic steroids may intensify the underlying glycemic control and impair the immune system of the body.[8] In order to survive in hypoxic host conditions and contribute to the development of Aspergillosis, Candidiasis, Cryptococcosis, Mucormycosis, and other fungal diseases, fungi have evolved a variety of adaptations.[9] This increases the likelihood of COVID-19 and fungal coinfection. A hypoxic environment also results from the requirement for and consumption of oxygen by the host and pathogen.[10]

The majority of the individuals in this study have either Miletus diabetes or de novo diabetics. When compared to females in this study, males have a higher percentage of fungal infections (77 % vs 23 %, respectively). The majority of patients get oxygen and steroid medication while being hospitalised to the ICU. In this investigation, the nasal cavity was the portion most frequently linked to fungus infections. The study's median age range for fungal infections is 40 to 60. According to a research by Noha Ahmed et al. (2021) the two most frequent organisms recovered in culture are Aspergillus spices (30%) and Mucor (78.8%). Most often isolated organisms in this study were Mucor (63.2%), Aspergillus flavus (13.8%), Rhizopus (10.1%), candida (0.071%), Aspergillus niger (0.044%), and Aspergillus fumigatous (0.01%), and we can see that this study is similar to earlier studies.[11,12]

There should be implementation of protocols for early detection of fungal infections and prompt treatment with recommended medications using corticosteroids sparingly in COVID-19 patients and surgical procedures, regular glucose levels monitoring, as well as implementation of proper hygiene and sanitization procedures.

Conclusion

Because fungal infections are severe illnesses, quick vigorous actions are essential. Good glycemic control with COVID-19 treatment. Use of masks by sensitive populations to decrease Mucorales exposure even at home, as well as avoidance of construction sites

The majority of people acquire the condition after being discharged from the COVID-19 facility. Patients may be recommended to seek emergency medical assistance if they develop early symptoms and signs of the disease after the COVID clinic. Fungal infection detection and management training for healthcare personnel should be conducted.

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References

1. Moorthy A, Gaikwad R, Krishna S, Hegde R, Tripathi KK, Kale PG, Rao PS, Haldipur D, Bonanthaya K. SARS-CoV-2, Uncontrolled Diabetes and Corticosteroids-An Unholy Trinity in Invasive Fungal Infections of the Maxillofacial Region? A Retrospective, Multi-centric Analysis. J Maxillofac Oral Surg. 2021 Mar;1-8.

2. Pal R, Singh B, Bhadada SK, COVID-19-associated mucormycosis: An updated systematic review of literature. Mycoses. 2021 June.

3. Ferguson BJ Mucormycosis of the nose and paranasal sinuses. Otolaryngol Clin North Am 33(2):2000

4. Banerjee I, Robinson J, Asim M, Sathian B, Banerjee I. Mucormycosis and COVID-19 an epidemic in a pandemic? Nepal J Epidemiol. 2021;11(2): 1034-1039.

5. Tandon, Abhishek; Pandey, Latika[1] **COVID-19, steroids, and** mucormycosis, Indian Journal of Ophthalmology: July 2021 - Volume 69 - Issue 7 - p 1970

6. Hoenigl M. Invasive fungal disease complicating COVID-19: when it rains it poursexternal icon. Clin Infect Dis. 2020 Sep.

7. Garcia-Vidal C, Sanjuan G, Moreno-García E, et al. Incidence of co-infections and superinfections in hospitalized patients with COVID-19: a retrospective cohort studyexternal icon. Clin Microbiol Infect. 2020 July.

8. Lansbury L, Lim B, Baskaran V, Lim WS. Co-infections in people with COVID-19: a systematic review and meta-analysisexternal icon. J Infect. 2020 May.

9. Gangneux JP, Bougnoux ME, Dannaoui E, Cornet M, Zahar JR. Invasive fungal diseases during COVID-19: We should be preparedexternal icon. J Mycol Med. 2020 June.

10. El-Kholy, N. A., El-Fattah, A. M. A., & Khafagy, Y. W. Invasive fungal sinusitis in post COVID-19 patients: a new clinical entity. The Laryngoscope, 2021, 131(12), 2652-2658.

11. Giri M, Puri A, Wang T, Guo S. Comparison of clinical manifestations, pre-existing comorbidities, complications and treatment modalities in severe and non-severe COVID-19 patients: a systemic review and meta-analysis. Sci Prog. 2021.

12. Yin T, Li Y, Ying Y, Luo Z. Prevalence of comorbidity in Chinese patients with COVID-19: systematic review and meta-analysis of risk factors. BMC Infect Dis. 2021.

Pathophysiologic Mechanism of Hematological Abnormalities in COVID-19 Patients and its Implication in the Prognosis and Disease Severity: A Retrospective Study in a Tertiary Care COVID Hospital

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Abstract

Introduction: Worldwide there was recent outbreak of a novel Corona Virus infection i.e. SARS COV19. Although it involves primarily the pulmonary system other systems like Cardiovascular, renal, neurological, hematological systems are also significantly involved by SARS COV19 infection.

Aim: In this study our aim was to analyze the pathophysiologic mechanism of hematological abnormalities in COVID-19 patients and its role in risk stratification, severity & prognosis of the disease.

Materials and Methods: In this study we have analyzed the clinical presentation and pathological laboratory results of hematological abnormalities retrospectively from previous records of COVID-19 patients admitted to our hospital. All the hematological parameters i.e. changes in Hb%, WBC Count, Platelet Count and Coagulation Profile parameters i.e. PT-INR, aPPT& D-dimer were analyzed and correlated with the disease severity and its prognosis. Statistical analysis was done be x^2 test.

Results: In our study the most common hematological abnormality was Lymphopenia followed by Leukocytosis and majority of the patient were >60 Yrs. age with male predominance.

Conclusion: Among all the hematological abnormalities coagulation parameter D-dimer (elevated levels) are most significantly associated with disease severity. Among the other hematological abnormalities the most common abnormality was Lymphopenia which along with combined features of Anemia, Leukocytosis andNeutrophilia were also significantly associated with disease severity. So, monitoring & evaluation of hematological parameters could be a crucial step towards risk stratification & management of COVID-19 patients.

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Introduction

Worldwide there was recent outbreak of COVID-19 disease. It is caused by a novel member of human corona virus which was first appeared in December 2019 in Wuhan, China. By International committee or Taxonomy of Viruses (ICTV) this novel virus was officially named as Severe Acute Respiratory Syndrome Corona Virus 2 [SARS-COV-2].[1] As a result of this pandemic there was significant impact on the health care systems along with socioeconomic aspects and the livelihoods of many.[2] This COVID-19 infection very quickly progress to a global pandemic mainly by person to person transmission through respiratory droplets.[3] Clinical presentation of this disease range from asymptomatic or mild respiratory infection(fever, cough & myalgia) to severe respiratory infection and multi-organ failure leading to death.[4] COVID-19 infection affects multiple systems i.e. Pulmonary (predominantly), Cardiovascular, gastrointestinal, neurological and hematological systems.[5,6] According to the Centers for Disease control and prevention guidelines leucopenia (9-25%), Leukocytosis (24-30%) and lymphopenia (63%) were the most common hematological abnormalities reported in hospitalized COVID-19 patients.[7]According to Guan et al 83.2%, 36.2% and 33.7% of COVID-19 patients had lymphopenia thrombocytopenia and Leukopenia respectively.[8]

Among the coagulation parameters elevated D-dimer level at the time of admission is one of the most significant factor for assessing disease progression severity of the disease, Critical Care Unit(CCU) admission and death of COVID-19 patients.[2] Abnormal hematological parameters (including ↑ D-dimer level) could help in earlier risk stratification and prognostication of COVID-19 patients.

In our study we analyzed the hematological abnormalities and their pathophysiological mechanisms i.e. abnormalities in Hb%, total leukocytes count, differential count, neutrophil to lymphocyte ratio, platelet count and abnormalities in the coagulation parameters specially D-dimer value at the time of hospitalization.

Aim

The aim of our study was to analyze the hematological abnormalities and their pathophysiological mechanisms along with it's correlation with the risk stratification, disease progression and severity of the disease in COVID-19 patients.

Materials and Methods

Study design and place of study :

This was a retrospective study done in our hospital college of Medicine and Sagore Dutta Hospital (CMSDH, Kolkata) which is a tertiary care hospital and was a designated COVID care hospital also.

Duration :

The study was conducted between 21st June 2020 to 21stDecember 2021(1.5yr).

Inclusion Criteria :

Patients having a positive RT-PCR test for SARS-COV-2 admitted to our hospital were included in the study.

Exclusion Criteria :

Patient having positive RT-PCR test for SARS-COV-2 but having previously diagnosed chronic diseases like renal failure, liver failure which might affect the hematological abnormalities are excluded from the study.

Case definition:

A person with a positive RT-PCR test for SARS-COV-2.

Categorization:

According to WHO clinical management of COVID-19 interim guidance of May 27 2020 COVID-19 patients were categorized in to the following categories. [9]

1. Moderate :

• Symptomatic patients meeting case definition for COVID-19.

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- Adolescent or adult with clinical signs of Pneumonia (fever, cough, dyspnea, fast breathing).

- But no severe Pneumonia(on imaging) including $SpO_2 >$, 90% or room air.

2. Severe :

- Symptomatic patients meeting case definition for COVID-19

- Adolescent or adult with clinical signs of Pneumonia (fever, cough, dyspnea, fast breathing) Plue one of the following.

- Respiratory rate> 30 breaths/minute or,

- Severe respiratory distress or,

- $SpO_2 <$ 90% on room air.

3. Critical :

These COVID-19 patients have any one of the following -

- Respiratory failure with requirement of mechanical ventilation or,

- Septic shock or,

- Multi organ failure that require monitoring in the CCU.

Sample Collection and Machinery used:

For routine hematological analysis: 2.5 ml. of peripheral venous blood was collected from each COVID-19 patients admitted in our hospital by experienced MT LAB (Medical Technologist)in an EDTA vacutainer tube. CBC (Complete Blood Count) i.e. total leukocyte count, differential count, platelet count, Hb%, RBC count and RBC indices were analyzed by automated cell counter 5 parts (Sysmes Xs-8001)

D-dimer **:**

In our hospital D-dimer analysis is done as part of a coagulation panel. For this the blood samples were collected into a citrate coated vial(In the ratio of 1:9). 1.8 ml of blood is sufficient for analysis. D-dimer value estimated by fully automated coagulation analyzer, STA Satellite Max, Stago, France by utilizing CL89050422.

Quality Control :

a.(For CBC)- Quality control is done by running

all the three levels of control, Low, Normal and High twice a day.

b. For D-dimer analysis both high and low controls were run three times weekly.

HRCT

For correlation of the severity of the COVID Pneumonia we have collected data of HRCT report of the respective patients from the hospital record. Severity of the Pneumonia were reported on the basis of CT severity Score as follow :- Score 0,1,2 (None, <50%, >50% of parenchymal involvement). Categorization of severity of COVID Pneumonia basing on CTSS were mild (Score<=7), moderate (Score 8-17) and severe (Score >=18).

Cut off values for hematological abnormalities.[10,11,12]

For anaemia- Hemoglobin value less than 13 gm/dl for male aged more than 15 years and hemoglobin less than 12 gm/dl for nonpregnant women aged more than 15 years.

For leucopenia total WBC count less than 3.6 x 10^9/ L

For thrombocytopenia total platelet count less than 150000/ uL

Ethical Consideration :

The study was approved by the Institutional Ethics Committee (IEC) of our institute.

In this retrospective study the data collected involves no potential harm to the patients and there is no link between the researcher and the patients.

Statistical analysis :

We used SPSS version 20.0 for analyzing the data and the values were represented as number and percentage (%). Comparison was done by x^2 test.

P-Value :

<0.05 was considered significant.

Results

In our study majority of the patients fall in the age group > 60 yrs. (n=132, 38%) with male predominance (n=220, 64.32%) (Table-1)

According to clinical presentation of severity most of the cases presented with moderate severity (n=260, 76.02%) (Tabel-1)

Among the hematological abnormalities lymphopenia followed by leukocytosis were seen most commonly (Table-2).

In our study severity of COVID Pneumonia was significantly associated with lymphopenia, leukocytosis, higher neutrophils to lymphocyte ratio and elevated D-dimer level. (Table 3 & 4).

Table 1: Age, sex and clinical presentation according to severity

n=342

Variables	n(number)	%(Frequency)
Age		
20-40 yrs.	90	26.31%
40-60 Yrs.	120	35%
> 60 Yrs.	132	38%
B . Sex		
Male	220	64.32%
Female	122	35.60%
C. Severity		
Moderate	260	76.02 %
Severe	62	18.12 %
Critical	22	6.43 %

Table 2: Hematological abnormalities seen in COVID-19 patients

n=342

	Abnormalities	n(number)	Frequency (%)
1.	Lymphopenia ($<1x10^9$ /L)	228	66.6%
2.	Neutrophilia ($>7.5 \times 10^9$ /L)	143	42%
3.	Leukopenia ($<4.5 \times 10^9$ /L)	24	7.1 %
4.	Leukocytosis ($>11 \times 10^9$/L)	102	29.82 %
5.	Combined neutrophilia and Lymphopenia (↑ N:L ratio)	33	9.64 %
6.	Anemia Hb<13.5 gm/dL (Men) < 11.6 gm/dL (Women)	88	26 %
7.	Thrombocytopenia ($<150 \times 10^3$/micro L)	92	26.9%
8.	D-dimer Values		
	<2.4 µg/ml.	256	74%
	>= 2.4 µg/ml.	86	25%

Table 3: Association of Lymphopenia, Leukocytosis, Leukopenia, combined Neutrophilia-lymphopenia (↑N:L ratio), anemia and Thrombocytopenia with that of disease severity.

n=342

Hematological Abnormality	Disease Severity
Lymphopenia Yes = 228(66.6%) No =114(33.3%)	
Leukocytosis Yes = 102(29.82%) No =240 (70.18%)	

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↑ N:L Ratio				
Yes = 33 (9.64%)	15 (45.4%)	12 (36.36 %)	6 (18.18%)	<0.001
No = 309 (90.36%)	225 (72.8%)	48 (15.53%)	36 (11.65%)	<0.001
Leukopenia				
Yes = 24 (7.1%)	18 (75.1%)	04 (16.6%)	02 (8.3 %)	<0.001
No = 318(92.90%)	230 (72%)	50 (15.7%)	38 (11.4 %)	<0.001

Table 4: Association of D-dimer level with disease severity.

n=342

Disease Severity	D-dimer < 2.4µg/ml.	D-dimer > 2.4 µg/ml.	P Value
Moderate	246 (98.8 %)	02 (2.4%)	<0.001
Severe	13 (1.1 %)	59 (71.08 %)	<0.001
Critical	02 (0.76 %)	22 (26.5 %)	<0.001

Discussion

Due to high infectivity of SARS-COV-2 very high number of patients presenting to hospitals and health centers leading to high burden on the human and mechanistic Capacity available, specially the need for critical support. For this reason early risk stratification of the COVID patients is absolutely helpful and needed also. [12,13]

Routine CBC (for hematological parameters) and D-dimer analysis play important role in the risk stratification of the COVID-19 patients.

Now coming to the postulated mechanisms for the hematological abnormalities.

RBC & hemoglobin :

According to Liu and Li certain SARS-COV-2 proteins may attack the ß-chain of hemoglobin, thus reducing its level.[14] Reduction in hemoglobin level and thus Oxygen contents might explain some of the symptoms of respiratory distress.

WBC :

Leukocytosis including neutrophilia may be due to viral induced inflammation or due to secondary bacterial infections (Which is seen in approximately 10% of COVID-19 patients).[15]

Lymphopenia is invasion of lymphocytes by the virus, as ACE-2 (Angiotensin Converting Enzyme-2) receptors are found on lymphocytes.[16] The virus may directly kill the lymphocytes by apoptosis, invade bone marrow cells or cause destruction of spleen or lymph node. Raised lactic acid levels in COVID-19 may lead to reduced lymphocyte proliferation. [17] The cytokine storm may adversely impact T-cell numbers and functions.[18]

Platelets :

The potential mechanism for reduced platelet count include

1. The direct effect of SARS-COV-2 on platelet production.

   This direct effect is due to the well known Phenomenon of cytokine storm in COVID-19 infection which damages hematopoietic progenitors and reduces platelet production.[19]

2. Autoimmune destruction of platelets.

   The potential mechanism for autoimmune destruction of platelets by SARS-COV-2 is molecular mimicry between the antigens of SARS –COV-2 and platelet glycoprotein's. This explains the reports of Post-COVID ITP & TTP. [20]

3. Increased platelet consumption .

In an autopsy study of COVID-19 patients platelet rich thrombi were found in the lungs, heart and bones. [21] This might explains the increased consumption of platelets due to formation of micro-thrombi in COVID-19 patients.

D-dimer (Coagulation and fibrinolytic system)

Mechanisms of D-dimer elevation are as follows –

1. SARS-COV-2 infection leads to aggressive pro-inflammatory response and insufficient anti inflammatoryresponse which might induce endothelial dysfunction resulting in excess thrombin generation.[22,23]

2. Hypoxia induced by severe COVID-19 infection stimulates thrombosis through hypoxia inducible transcription factor(HIF) dependent signaling pathway and increasing blood viscosity.[24]

3. Hospitalized patients having elder, age, underlying Co-morbid conditions, long term bed rest and invasive treatment etc. all are associated with increased risk for thrombosis or hyper-coagulation.[25]

4. Some patients develop sepsis induced coagulopathy or DIC. [26]

Now coming to brief discussion on our result along with review of literature.

In our study out of total 342 Covid-19 cases lymphopeniawas seen 228 cases(66.6%) and found to be the most common hematological abnormality. According to Wan et al lymphopenia was found in 50.4% cases. [27]

In our study neutrophilia was seen in 143 cases (42%) which is similar to the study by Chen et al[1] in which neutrophilia was found in 38% of cases.

According to Qian et alanemia was found in 36.3% of cases and elevated D-dimer was found in 24.2% of cases. In our study anemia was found in 88 cases (26%) and elevated D-dimer value was seen in 86 cases(25%). [28]

In our study severity of Covid Pneumonia had shown significant association with leukocytosis,

neutrophilia, lymphopenia, higher neutrophil to lymphocyte ratio and elevated D-dimer levels which is in concordance with the study by Qin et al.[29]

Conclusion

The hematological abnormalities commonly seen in COVID-19 patients are leukocytosis, lymphopenia, elevated neutrophil to lymphocyte ratio and elevated D-dimer level.

In severe & critical COVID-19 patients these alterations were much more than in moderate COVID-19 cases. Thus these parameters serve as a possible biomarkers for early risk stratification of COVID-19 patients requiring CCU care for chances of better clinical outcome and survival rate.

Conflicts of interest – None

Contribution of authors – All have equal contribution

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References

1. Chen N, Zhou M, Dong X, Qu J, Gong F, Han Y, Qiu Y, Wang J, Liu Y, Wei Y, Yu T. Epidemiological and clinical characteristics of 99 cases of 2019 novel coronavirus pneumonia in Wuhan, China: a descriptive study. The lancet. 2020 Feb 15;395(10223):507-13. doi.org/10.1016/S0140-6736(20)30211-7

2. World Health Organization. (2020). Coronavirus disease 2019 (COVID-19): situation report, 73.

3. Rabi FA, Al Zoubi MS, Kasasbeh GA, Salameh DM, Al-Nasser AD. SARS-CoV-2 and Coronavirus Disease 2019: What We Know So Far. Pathogens. 2020 Mar 20;9(3):231. doi: 10.3390/pathogens9030231. PMID: 32245083; PMCID: PMC7157541.

4. Adhikari SP, Meng S, Wu YJ, Mao YP, Ye RX, Wang QZ, Sun C, Sylvia S, Rozelle S, Raat H, Zhou H. Epidemiology, causes, clinical manifestation and diagnosis, prevention and control of coronavirus disease (COVID-19) during the early outbreak period: a scoping review. Infect Dis Poverty. 2020 Mar 17;9(1):29. doi: 10.1186/s40249-020-00646-x. PMID: 32183901; PMCID: PMC7079521.

5. Gavriatopoulou M, Korompoki E, Fotiou D, Ntanasis-Stathopoulos I, Psaltopoulou T, Kastritis E, Terpos E, Dimopoulos MA. Organ-specific manifestations of

Sharmistha Debnath, Sajeeb Mondal, Madhuri Ranjana Biswas. Pathophysiologic Mechanism of
Hematological Abnormalities in COVID-19 Patients and its Implication in the Prognosis and
Disease Severity: A Retrospective Study in a Tertiary Care COVID Hospital

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COVID-19 infection. Clin Exp Med. 2020 Nov;20(4):493-506. doi: 10.1007/s10238-020-00648-x. Epub 2020 Jul 27. PMID: 32720223; PMCID: PMC7383117.

6. Terpos E, Ntanasis-Stathopoulos I, Elalamy I, Kastritis E, Sergentanis TN, Politou M, Psaltopoulou T, Gerotziafas G, Dimopoulos MA. Hematological findings and complications of COVID-19. Am J Hematol. 2020 Jul;95(7):834-847. doi: 10.1002/ajh.25829. Epub 2020 May 23. PMID: 32282949; PMCID: PMC7262337.

7. Prevention CfDCa. Interim clinical guidance for management of patients with confirmed Coronavirus Disease (COVID-19) 2020. Available from: gov/coronavirus/2019-ncov/hcp/clinical-guidance-management-patients.html.https://www.cdc. Accessed February 24, 2021.

8. Guan WJ, Ni ZY, Hu Y, Liang WH, Ou CQ, He JX, Liu L, Shan H, Lei CL, Hui DSC, Du B, Li LJ, Zeng G, Yuen KY, Chen RC, Tang CL, Wang T, Chen PY, Xiang J, Li SY, Wang JL, Liang ZJ, Peng YX, Wei L, Liu Y, Hu YH, Peng P, Wang JM, Liu JY, Chen Z, Li G, Zheng ZJ, Qiu SQ, Luo J, Ye CJ, Zhu SY, Zhong NS; China Medical Treatment Expert Group for Covid-19. Clinical Characteristics of Coronavirus Disease 2019 in China. N Engl J Med. 2020 Apr 30;382(18):1708-1720. doi: 10.1056/NEJMoa2002032. Epub 2020 Feb 28. PMID: 32109013; PMCID: PMC7092819.

9. WHO. Clinical management of COVID-19: interim guidance, 27 May 2020. World Health Organization. 2020 Available from: https://apps.who.int/iris/handle/10665/332196

10. WHO. Haemoglobin concentrations for the diagnosis of anemia and assessment of severity: VMNIS Vitamin and Mineral Nutrition Information System. Report of a WHO scientific group. 2011 Available from: http://www.who.int/vmnis/indica tors/haemoglobin/en.

11. Tsegaye A, Messele T, Tilahun T, Hailu E, Sahlu T, Doorly R, Fontanet AL, Rinke de Wit TF. Immunohematological reference ranges for adult Ethiopians. Clin Diagn Lab Immunol. 1999 May;6(3):410-4. doi: 10.1128/CDLI.6.3.410-414.1999. PMID: 10225845; PMCID: PMC103732.

12. Thachil J, Bates I. Approach to the Diagnosis and Classification of Blood Cell Disorders. Dacie and Lewis Practical Haematology. 2017:497–510. doi: 10.1016/B978-0-7020-6696-2.00023-0. Epub 2016 Oct 21. PMCID: PMC7150139.

13. Tang N, Li D, Wang X, Sun Z. Abnormal coagulation parameters are associated with poor prognosis in patients with novel coronavirus pneumonia. J Thromb Haemost. 2020 Apr;18(4):844-847. doi: 10.1111/jth.14768. Epub 2020 Mar 13. PMID: 32073213; PMCID: PMC7166509.

14. wenzhong liu, hualan L. COVID-19:Attacks the 1-Beta Chain of Hemoglobin and Captures the Porphyrin to Inhibit Human Heme Metabolism. ChemRxiv. Cambridge: Cambridge Open Engage; 2020; This content is a preprint and has not been peer-reviewed.

15. Huang C, Wang Y, Li X, Ren L, Zhao J, Hu Y, Zhang L, Fan G, Xu J, Gu X, Cheng Z, Yu T, Xia J, Wei Y, Wu W, Xie X, Yin W, Li H, Liu M, Xiao Y, Gao H, Guo L, Xie J, Wang G, Jiang R, Gao Z, Jin Q, Wang J, Cao B. Clinical features of patients infected with 2019 novel coronavirus in Wuhan, China. Lancet. 2020 Feb 15;395(10223):497-506. doi: 10.1016/S0140-6736(20)30183-5. Epub 2020 Jan 24. Erratum in: Lancet. 2020 Jan 30;: PMID: 31986264; PMCID: PMC7159299.

16. Xu H, Zhong L, Deng J, Peng J, Dan H, Zeng X, Li T, Chen Q. High expression of ACE2 receptor of 2019-nCoV on the epithelial cells of oral mucosa. Int J Oral Sci. 2020 Feb 24;12(1):8. doi: 10.1038/s41368-020-0074-x. PMID: 32094336; PMCID: PMC7039956.

17. Tan L, Wang Q, Zhang D, Ding J, Huang Q, Tang YQ, Wang Q, Miao H. Lymphopenia predicts disease severity of COVID-19: a descriptive and predictive study. Signal Transduct Target Ther. 2020 Mar 27;5(1):33. doi: 10.1038/s41392-020-0148-4. Erratum in: Signal Transduct Target Ther. 2020 Apr 29;5(1):61. PMID: 32296069; PMCID: PMC7100419.

18. Diao B, Wang C, Tan Y, Chen X, Liu Y, Ning L, Chen L, Li M, Liu Y, Wang G, Yuan Z, Feng Z, Zhang Y, Wu Y, Chen Y. Reduction and Functional Exhaustion of T Cells in Patients With Coronavirus Disease 2019 (COVID-19). Front Immunol. 2020 May 1;11:827. doi: 10.3389/fimmu.2020.00827. PMID: 32425950; PMCID: PMC7205903.

19. Xu P, Zhou Q, Xu J. Mechanism of thrombocytopenia in COVID-19 patients. Ann Hematol. 2020 Jun;99(6):1205-1208. doi: 10.1007/s00277-020-04019-0. Epub 2020 Apr 15. PMID: 32296910; PMCID: PMC7156897.

20. Hindilerden F, Yonal-Hindilerden I, Sevtap S, Kart-Yasar K. Immune Thrombocytopenia in a Very Elderly Patient With Covid-19. Front Med (Lausanne). 2020 Jul 10;7:404. doi: 10.3389/fmed.2020.00404. PMID: 32754609; PMCID: PMC7365892.

21. Ratajczak MZ, Kucia M. SARS-CoV-2 infection and overactivation of Nlrp3 inflammasome as a trigger of cytokine "storm" and risk factor for damage of

hematopoietic stem cells. Leukemia. 2020 Jul;34(7):1726-1729. doi: 10.1038/s41375-020-0887-9. Epub 2020 Jun 1. PMID: 32483300; PMCID: PMC7262681.

22. Wong JP, Viswanathan S, Wang M, Sun LQ, Clark GC, D'Elia RV. Current and future developments in the treatment of virus-induced hypercytokinemia. Future Med Chem. 2017 Feb;9(2):169-178. doi: 10.4155/fmc-2016-0181. Epub 2017 Jan 27. PMID: 28128003; PMCID: PMC7079716.

23. Levi M, van der Poll T. Coagulation and sepsis. Thromb Res. 2017 Jan;149:38-44. doi: 10.1016/j.thromres.2016.11.007. Epub 2016 Nov 19. PMID: 27886531.

24. Gupta N, Zhao YY, Evans CE. The stimulation of thrombosis by hypoxia. Thromb Res. 2019 Sep;181:77-83. doi: 10.1016/j.thromres.2019.07.013. Epub 2019 Jul 15. PMID: 31376606.

25. Harper PL, Theakston E, Ahmed J, Ockelford P. D-dimer concentration increases with age reducing the clinical value of the D-dimer assay in the elderly. Intern Med J. 2007 Sep;37(9):607-13. doi: 10.1111/j.1445-5994.2007.01388.x. Epub 2007 Jun 2. PMID: 17543005.

26. Iba T, Levy JH, Warkentin TE, Thachil J, van der Poll T, Levi M; Scientific and Standardization Committee on DIC, and the Scientific and Standardization Committee on Perioperative and Critical Care of the International Society on Thrombosis and Haemostasis. Diagnosis and management of sepsis-induced coagulopathy and disseminated intravascular coagulation. J Thromb Haemost. 2019 Nov;17(11):1989-1994. doi: 10.1111/jth.14578. Epub 2019 Aug 13. PMID: 31410983.

27. Wan S, Xiang Y, Fang W, Zheng Y, Li B, Hu Y, Lang C, Huang D, Sun Q, Xiong Y, Huang X, Lv J, Luo Y, Shen L, Yang H, Huang G, Yang R. Clinical features and treatment of COVID-19 patients in northeast Chongqing. J Med Virol. 2020 Jul;92(7):797-806. doi: 10.1002/jmv.25783. Epub 2020 Apr 1. PMID: 32198776; PMCID: PMC7228368.

28. Chu CM, Cheng VC, Hung IF, Wong MM, Chan KH, Chan KS, Kao RY, Poon LL, Wong CL, Guan Y, Peiris JS, Yuen KY; HKU/UCH SARS Study Group. Role of lopinavir/ritonavir in the treatment of SARS: initial virological and clinical findings. Thorax. 2004 Mar;59(3):252-6. doi: 10.1136/thorax.2003.012658. PMID: 14985565; PMCID: PMC1746980.

29. Qin C, Zhou L, Hu Z, Zhang S, Yang S, Tao Y, Xie C, Ma K, Shang K, Wang W, Tian DS. Dysregulation of Immune Response in Patients With Coronavirus 2019 (COVID-19) in Wuhan, China. Clin Infect Dis. 2020 Jul 28;71(15):762-768. doi: 10.1093/cid/ciaa248. PMID: 32161940; PMCID: PMC7108125.

Joint Mobility among Patients with Trochanteric Bursitis in Erbil-Iraq

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Abstract

Background: Trochanteric bursitis is the inflammation of greater trochanter bursa, which is located lateral to the greater trochanter of the femur. The underlying causes of trochanteric bursitis are multifactorial. Joint mobility considered as one of the possible causes; Joint laxity is a condition in which the range of motion in the joints are greater than normal, which are more in women than men with higher prevalence in young ages.

Aim of the study: to assess joint mobility among people with trochanteric bursitis.

Patients and Methods: A cross sectional study was conducted in Rheumatology Outpatient clinic in Rizgary Teaching Hospital in Iraqi Kurdistan region between February and December 2021. A sample of 100 Iraqi patients with trochanteric bursitis, and another 100 healthy controls matched in age and sex were studied. Beighton score were performed on patients and controls to assess joint mobility.

Results: Joint hypermobility was reported in 24(12%) patients with trochanteric bursitis compared to 29(14.5%) in healthy controls (p= 0.423, OR 0.773; 95%CI 0.412-1.452), no significant differences were detected between the two groups. Joint hypermobility was more in females using cutoff score ≥4 of Beighton score; forty-six among fifty-three hypermobile participants were female, the p-value was 0.001 which was statistically significant.

Conclusion: There is no positive correlation between joint hypermobility and the presence of trochanteric bursitis.

Keywords: Joint hypermobility, Trochanteric bursitis, Body mass index, Beighton score.

Introduction

Trochanteric bursitis is the inflammation of greater trochanter bursa, which is located lateral to the greater trochanter of the femur, adjacent to the tensor fascia lata and iliotibial band superficially, enclosed to vastus lateralis, gluteus medius and minimus insertions. Bursae are prospect sacs filled with fluid act as a cushion between soft tissues and bone prominences [1].

In 1923 Stegemann used the term trochanteric bursitis was used to explain the recurrent chronic pain in the lateral aspect of the hip joints [2], nowadays the term "greater trochanteric pain syndrome"(GTPS) used to report pain and tenderness in lateral aspect of hips [3].

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Trochanteric bursitis has been seen in 10-25% of the population, and the incidence of newly diagnosed cases has been estimated to be 2-6 per 1000 in a year [4]. Trochanteric bursitis has been estimated to be more among patients with low back pain [5], GTPS can occur in adults of any age, appeared to be much more common in females 80% than males [6]. It present with chronic, persistent pain at the lateral aspect of the hip joint, the pain increased during walking, running, or sleeping on the affected side, with eliciting pain on the abduction of the diseased side against resistant on clinical examination [7], in addition to the clinical examination the Ultrasound and MRI can be used for the diagnosis of trochanteric bursitis; mainly assist to differentiate it from other causes of hip joint pain via visualizing distention or fluid collection in one of the bursae of the attached tendon to the greater trochanter[8]. The underlying causes of trochanteric bursitis are multifactorial. Generalized joint hypermobility (GJH) is considered as one of the causes [9].

The first description of the relationship between joint hypermobility and rheumatological symptoms emerge from Sutro in 1947, who described number of young adult patients with knee joint swelling with hypermobile knee and ankle joints [10].

Beighton score is a valid and reliable tool used worldwide to screen for joint hypermobility [11]. which was a revision of the system recommended by Carter and Wilkinson [12], the measurement of hypermobility currently used in most epidemiological studies of GJH was described by Beighton [13].

One of the common complaints of symptomatic GJH is musculoskeletal pain, which may affect daily activities [14], in addition to that the sport-related injuries to knees, ankles, and shoulder joints are more reported in hypermobile individuals [15]. The chondromalacia patellae incidence is higher in hypermobile patients in comparison to healthy individuals without lax joint [16], moreover studies showed that there was a relation between joint hypermobility and asthma [17].

The aim of this study was to investigate the prevalence of joint hypermobility in patients with trochanteric bursitis and to evaluate the possible correlation between joint hypermobility and trochanteric bursitis.

Individuals and Methods

A cross sectional study was conducted in Rheumatology Outpatient clinic in Rizgary Teaching Hospital in Iraqi Kurdistan region, from February to December 2021. One hundred (100) patients with trochanteric bursitis; and another 100 healthy controls matched in age, sex and baseline characteristics were studied. all were randomly selected during the period of the study.

One hundred (100) patients with trochanteric bursitis were diagnosed by a thorough history and complete physical examination by one of us. The diagnosis confirmed by ultrasound examination in 69 patients.

We used paper clinical research form through interview and questionnaires for data collection. We asked the patients about age, sex, Participants from both groups were assessed clinically for body weight, height, and Body Mass Index (BMI). The BMI calculation was performed using a metric formula. The participants asked for pain at the site of the greater trochanter either unilateral or bilateral, the duration and severity of pain. The pain severity assessed by using the Numerical Pain Rating Scale. All were assessed for pain in other joints, back pain, flat feet, and true leg length was measured in centimeters.

Furthermore, all studied individuals were assessed blindly for joint mobility, at four peripheral sites bilaterally and forward flexion of the trunk, the assessment was done by another observer blindly without knowledge of individual group using the Beighton score, a cutoff score ≥4 is taken as a positive marker of joint hypermobility [13].

Inclusion criteria:

Males and females were included in the study, the participants aged between 20 to 60 years old.

Exclusion criteria: participants with history of trauma to the hip joints, pregnant women, patients with connective tissue disease including Marfan and Ehlers-Danlos syndrome (EDS) were excluded from the study.

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Ethical Consideration:

A verbal and written consent statement was taken from all individuals in both groups. Ethical approval was obtained from the Ethics and Scientific Committees of Kurdistan Board for Medical Specialties for scientific assessment with approval 403 at (8th/Feb/2021). The study also secured data confidentiality.

Statistical analysis:

The Statistical Package for Social Sciences (SPSS, version 25) application was used to analyze the outcome data. The variables were coded and analyzed for baseline socio-demographic characteristics, the severity of pain and method of diagnosis. Continuous variables were presented as mean values with standard deviation (SD) when normally distributed and categorical data were presented as percentage proportion The Chi square test of association was used to compare the proportion of patients and healthy control groups with joint hypermobility. Fisher's exact test was used when the expected frequency (value) was less than five of more than 20% of the cells of the table.

The P value of ≤ 0.05 was considered as statistically significant. Odds ratio was used to indirectly estimate the association between joint hypermobility and trochanteric patients.

Results

Out of 204 individuals evaluated, four were excluded one patient diagnosed as Marfan syndrome, and three patients had connective tissue disease. Two-hundred 200 individuals were enrolled in the study; one hundred (100) were patients with trochanteric bursitis and one hundred (100) were healthy individuals. Their mean age was (41 ± 13) years in patients' group, and (39 ±12) in healthy controls, with their real age data ranging from 20 to 60 years old. females in patients and healthy controls (78%, 60% respectively) while males were 22%,40% respectively). forty-six (46) out of two hundred (200) participants were smokers (18 in patients and 28 in the control group). The Body mass index was (29 ± 5 SD) in the patients which was slightly higher in comparison to healthy controls (27 ± 5 SD); p-value was 0.092 the deference was insignificant. Moreover, more than (68%, 81%) have no comorbidities in patients and healthy controls respectively, as shown in table 1.

Table 1: Baseline Socio demographic Characteristics of Study

Categories		Patients N. (100) N.%	Controls N. (100) N.%	P value
Age		41±13(100)	39±12	0.02
	Male	22(22.0%)	40 (40.0%)	0.05*
	Female	78(78.0%)	60 (60.0	
Smoker	Yes	18(18.0) %	28(28.0%)	0.031
	No	82(82%)	72(72.0 %)	
Job	Employee	31(31.0%)	39(39.0%)	0.093
	non-employee	17(17.0%)	27(27.0 %)	
	Housewife	52(52.0%)	34 (34.0%)	
(Body mass index) BMI		29±5 (100%)	27±5 (100%)	0.092
Comorbidities	No	68 (68.0%)	81 (81.0%)	0.02
	HTN	19 (19.0%)	5 (5.0%)	
	DM	10 (10.0%)	4 (4.0%)	
	HTN+DM	3 (3.0%)	5 (5.0%)	
	Others	0 (0.0%)	5 (5.0%)	

Table 2: baseline characteristics of pain, severity of pain, methods of diagnosis of trochanteric bursitis, leg length discrepancy.

		Patients	Controls	
		N=100	N=100	P value
		N %	N %	
pain at site of trochanteric bursitis	Yes	100 (100.0%)	0 (0.0%)	0.00 *
	No	0 (0.0%)	100 (100.0%)	
Duration of pain	less than 2 weeks	38(38.0%)	0(0.0%)	0.00
	More than 2 weeks	62(62%)	0(0.0%)	
severity of pain	None	0 (0.0%)	100 (100.0%)	0.00*
	Mild	9 (9.0%)	0 (0.0%)	
	Moderate	46 (46.0%)	0 (0.0%)	
	Severe	45 (45.0%)	0 (0.0%)	
clinical DX	Yes	100 (100.0%)	0 (0.0%)	0.00
	No	0 (0.0%)	100 (100.0%)	
U/S Diagnosis	Yes	69 (69.0%)	0 (0%)	0.00
	Not done	31 (31.0%)	100 (100.0%)	
back pain	Yes	74 (74.0%)	65 (65.0%)	0.167
	No	26 (26.0%)	35 (35.0%)	
sleep disturbance	Yes	48 (48.0%)	39 (39.0%)	0.199
	No	52 (52.0%)	61 (61.0%)	
flat feet	Yes	24 (24.0%)	37 (37.0%)	0.046
	No	76 (76.0%)	63 (63.0%)	
leg length discrepancy	Yes	24 (24.0%)	19 (19.0%)	0.389
	No	76 (76.0%)	81 (81.0%)	

*Fisher exact test

Sixty-two (62) out of 100 patients with GTPS had pain for more than 2 weeks, all patients with trochanteric bursitis were diagnosed clinically, in addition to that confirmation by ultrasound findings were done in 69 patients out of 100. Sleep disturbance in both groups were (48% and 39%) respectively, also flat feet were 24% in patients' group in compared to 37% in healthy individuals, furthermore leg length discrepancy observed in one-fourth of the patient's group while it was 19% in normal individuals. As shown in table two (2)

Table 3: Associations of joint mobility with Genders

		Total N=200 %	Joint Hypermobility N=53	Normal joint mobility N=147	P value
Gender	Males	62 (31.0%)	7 (11.3%)	55 (88.7%)	0.001
	Females	138(69.0%)	46 (33.3%)	92 (66.7%)	

Among 62 (31.0%) males only seven (11.3%) were hypermobile, and among 138(69.0%) females only forty-six (33.3%) were hypermobile, p-value was 0.001 which was statistically significant. as shown in table 3.

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Joint mobility was normal in 76 (38%) of patients with trochanteric bursitis and 71 (35.5%) of healthy controls. JHM was observed in 24(12%) patients with trochanteric bursitis while it was 29(14.5%) in control group (p-value; 0.423, OR (0.773: 95%CI 0.412-1.452).

Beighton score, a cutoff score ≥4 is taken as a positive marker of joint hypermobility. We found that there was no significant association between joint hypermobility and trochanteric bursitis. As shown in figure 1.
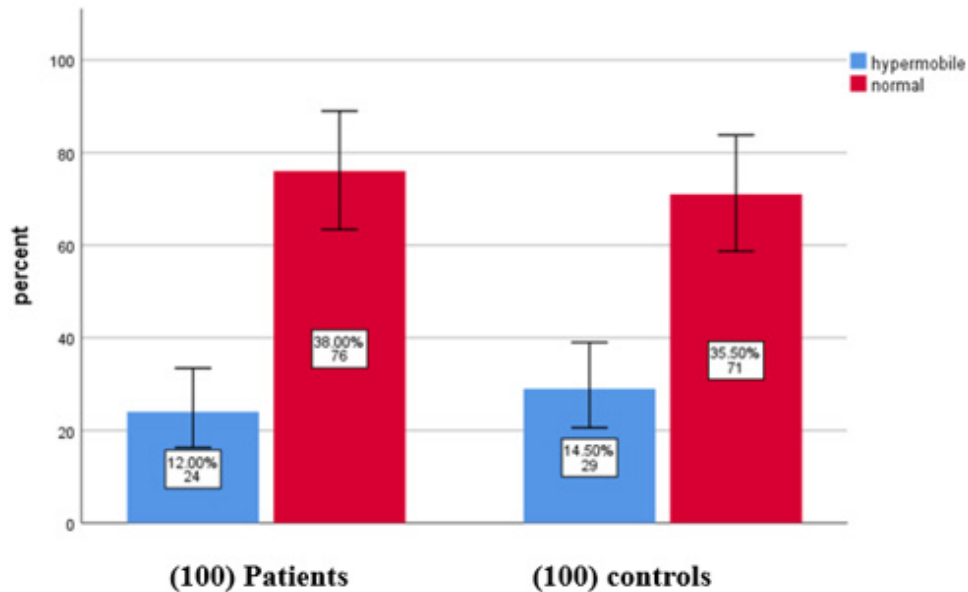

Figure 1. Prevalence of joint hypermobility among 100 patients with trochanteric bursitis and 100 healthy controls.

Discussion

Joint mobility among normal individuals varies widely from race to race 18.Age and sex variations were also reported [13,19,20]. Diminished joint mobility becomes pronounced with ageing, Females have a greater degree of joint laxity than males of the same age [21]. It was reported that Iraqis have more joint laxity than Caucasians[22].

Trochanteric bursitis is a relatively common reported inflamed bursa in the body [23]. nevertheless, the possible association between joint mobility and GTPS has not been reported in a controlled study. We found it relevant to estimate the prevalence of joint mobility in patients diagnosed with GTPS, although there is a study of association of Joint hypermobility with GTPS in Danish by Reimer et al[23].

In the current study joint mobility in both female and males were 53 out of 200 participants, among 62 (31.0%) males only seven (11.3%) were hypermobile, and among 138(69.0%) females forty-six (33.3%) were hypermobile (as shown in table 3),

the possible explanation could be the fact that most of the participants in both groups were females (as shown in table 1).

This study showed that there was no association between trochanteric bursitis and joint mobility. As the results revealed that the number of participants with joint hypermobility among trochanteric bursitis group 12% which was lower than the number of GHM among healthy controls 14.5% (as shown in figure 1). This result disagreed with a study conducted by Reimer et al as the prevalence of joint hypermobility was higher among patients with GTPS[23].

In this study the prevalence of joint hypermobility in males were (11.3%) and in females were (33.3%) (table 3), while in a study conducted by Al-Rawi et al joint hypermobility was reported in 25.4% of males and 38.5% of females[22]. This could be explained by the much older age group among our participants; mean age was 41 ± 13 and 39 ±12 in patients and healthy controls respectively (as shown in table1), compared to the other author participants mean age (20 to 24 years old). As it is well known that younger

age individuals' joints are more mobile than old age individuals[21]. our study similar to a study by Reimer et al, as their participants ages were 63 and 53 years for male and females respectively. It is well known that joint mobility varies with age and sex[24].

This study agreed with another study [25], showing that the prevalence of trochanteric bursitis related to gender; more than 70% of patients with GTPS were females (as shown in table 1), while age and BMI were not found to be significantly associated with GTPS status.

Conclusion

We concluded that there is no positive correlation between joint hypermobility and the presence of trochanteric bursitis.

Conflict of Interest: In conducting this study, we hereby declare that there are no conflicts of interest

Reference:

1. Ho GW, Howard TM. Greater trochanteric pain syndrome: more than bursitis and iliotibial tract friction. Current sports medicine reports. 2012 Sep 1;11(5):232-8

2. Stegemann H. Die chirurgische bedevtung paraartikularer kalkablagerungen. Arch Klin Chir. 1923;125(718):38

3. Tortolani PJ, Carbone JJ, Quartararo LG. Greater trochanteric pain syndrome in patients referred to Orthopedic Spine Specialists. The Spine Journal. 2002 Jul 1;2(4):251-4.

4. Fearon AM, Cook JL, Scarvell JM, Neeman T, Cormick W, Smith PN. Greater trochanteric pain syndrome negatively affects work, physical activity and quality of life: a case control study. The Journal of Arthroplasty. 2014 Feb 1;29(2):383-6.

5. Hirschmann A, Falkowski AL, Kovacs B. Greater trochanteric pain syndrome: abductors, external rotators. Semin Musculoskeletal Radiol. 2017 Nov (Vol. 21, No. 05, p. 539-6).

6. Lievense A, Bierma-Zeinstra S, Schouten B, Bohnen A, Verhaar J, Koes B. Prognosis of trochanteric pain in primary care. British Journal of General Practice. 2005 Mar 1;55(512):199-204.

7. Mulford K. Greater trochanteric bursitis. J Nurse Pract Elsevier BV .2007:3;328-32.

8. Klontzas ME, Karantanas AH. Greater trochanter pain syndrome: a descriptive MR Imaging study. European Journal of Radiology. 2014 Oct; 83(10):1850-5.

9. Giordano BD. Assessment and treatment of hip pain in the adolescent athlete. Pediatr Clin 2014; 61.6:1137-54

10. Sutro CJ. Hypermobility of bones due to over lengthened capsular and ligamentous tissues; a cause for recurrent intra-articular effusions. Surgery. 1947 Jan ;21(1):67-76.

11. Beighton PH, Horan F. Orthopaedic aspects of the Ehlers Danlos syndrome. The Journal of Bone and Joint surgery. British volume. 1969 Aug;51(3):444-53.

12. Carter C, Wilkinson J. Persistent joint laxity and congenital dislocation of the hip. The Journal of Bone and Joint Surgery. British volume. 1964 Feb;46(1):40-5

13. Beighton PH, Solomon L, Soskolne CL. Articular mobility in an African population. Annals of the Rheumatic Diseases. 1973 Sep;32(5):413

14. Kumar B, Lenert P. Joint hypermobility syndrome: recognizing a commonly overlooked cause of chronic pain. The American Journal of Medicine. 2017 Jun 1;130(6):640-7.

15. Cameron KL, Duffey ML, DeBerardino TM, Stoneman PD, Jones CJ, Owens BD. Association of generalized joint hypermobility with a history of glenohumeral joint instability. Journal of Athletic Training. 2010 May;45(3):253-8.

16. Al-Rawi Z, Nessan AH. Joint hypermobility in patients with chondromalacia patellae. British Journal of Rheumatology. 1997 ;36(12):1324-7

17. Al-Rawi ZS, Gorial FI, Menshad AD. Joint Hypermobility and Joint Hypermobility Syndrome in Iraqi Patients with Asthma. Int. J. Modern Biol. Med. 2012;2(1):39-45

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18. Schweitzer, G. Laxity of metacarpophalangeal joints of finger and interphalangeal joint of the thumb: a comparative international study. South African Medical Journal 1970; 44:246-52.

19. Ellis PE, Bundick WR. Cutaneous elasticity and hyperelasticity. Arch Dermatol 1956;74(1)22-32.

20. Wynne-Davies R. Familial joint laxity. Proc R Soc Med 1971,64:689-90.

21. Kirk JA, Ansell BM, Bywaters EGL. The hypermobility syndrome. Ann Rheum Dis 1967,26: 419-25.

22. Al-Rawi ZS, AL-Azawi AJ, AL-Chalabi TA. Joint mobility among university students in Iraq. Rheumatology. 1985 Nov 24(4):326-31.

23. Reimer LC, Jacobsen JS, Mechlenburg I. Hypermobility among patients with greater trochanteric pain syndrome. Dan Med J. 2019 Apr 1;66(4)

24. Beighton PH, Grahame R, Bird H. Hypermobility of joints.4th ed. London. Springer Science & Business Media; 2011.

25. Segal NA, Felson DT, Torner JC, Zhu Y, Curtis JR, Niu J, Nevitt MC, Group MO. Multicenter Osteoarthritis Study Group.Greater trochanteric pain syndrome: epidemiology and associated factors. Arch Phys Med Rehabil. 2007 Aug;88(8):98892.

Interceptive Orthodontic Treatment using the Versatile 2 x 4 Appliance: A Case Report

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Abstract

The mixed dentition period is considered one of the most ideal ages for undergoing interceptive orthodontic treatment. Children possess a higher perception of dental esthetics. Dental malocclusions were found to affect the self-esteem of the children. American Association of Orthodontics recommends that a child can undergo orthodontic treatment at the early age of 7 years. Certain malocclusions can be corrected during the mixed dentition period aids in the normal growth of jaws and surrounding structures. This article describes successful management of a case with angles class I malocclusion with upper anterior proclination treated using 2 x 4 appliance. The 2 x 4 appliance is a partially fixed orthodontic appliance that is used in children in a mixed dentition period to correct simple malocclusions associated with permanent anterior teeth.

Keywords: 2 x 4 appliance, Interceptive orthodontics, Mixed dentition, Children, Malocclusion, Increased overjet.

Introduction

The mixed dentition period is regarded as one of the most critical ages for receiving orthodontic treatment. One common misconception among parents is that orthodontic treatment should begin only after all permanent teeth have fully erupted. Early orthodontic intervention is usually aimed at decreasing the severity of the malocclusion. Early correction of malocclusion aids in normal growth and development of jaws and surrounding structures which leads to malocclusion. Moreover, the esthetic

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appearance and a balanced smile at an early age improve the self-confidence and overall personality of the child.[1-3]

Crossbite, midline diastema, increased overjet, ectopic eruption of teeth are the commonly occurring malocclusions. Most of these malocclusions are treated using a removable appliance in mixed dentition period. The removable appliances require patient cooperation which is difficult to achieve in this age group. Another drawback of removable appliances is that only limited tooth movement is achieved using removable orthodontic appliances.[4, 5] Initial speech difficulty due to palatal coverage of the appliance, progressive loosening of the appliance used, and the tendency of the patient to flick the loose appliance in and out with the tongue were the common problems associated with removable appliances.[5]

A 2x4 appliance is a versatile fixed appliance used to correct various malocclusions associated with permanent incisors. The appliance 2 x 4 comprises four brackets bonded onto the erupted permanent incisors, two bands cemented with molar tubes bonded on the first permanent molars, and a continuous archwire to provide/ maintain good arch form.[5] Rotations, ectopic eruption of incisors, crossbites, midline diastema can be corrected using this versatile appliance in a short duration.[6 - 11] This simple appliance helps in the rapid correction of simple malocclusions more effectively and efficiently.

The present article highlights a case report of successful correction of ectopic eruption of permanent incisors using the versatile 2 x 4 appliance.

Case Report

A nine-year-old female patient reported to the Department of Pedodontics and Preventive dentistry, with the chief complaint of forwardly placed upper anterior teeth. No abnormal oral habits were detected. Extra-oral examination revealed an orthognathic profile. Intra-oral examination showed U shaped arch with proclination of 21, 22. Overjet was found to be 4mm with respect to 21 and 22. The patient was in a mixed dentition period. A midline shift in the mandibular anterior on right side was noticed due to the congenitally missing lower right lateral incisor. Orthopantomogram was taken. Impressions

made in relation to the upper and lower arches and mixed dentition analysis was done. Moyers analysis revealed the presence of adequate space for teeth alignment. The diagnosis was made as Angle's class I malocclusion with upper anterior proclination of 21 and 22. 2x4 fixed orthodontic treatment was planned. The treatment plan was explained to the parents and written consent was taken before starting the treatment. Orthodontic molar bands with buccal tubes were cemented on permanent first molars. Brackets were bonded on the upper permanent incisors. Initial alignment was done using 0.014 NiTi wire. We replaced the wire to 0.016 NiTi wire at 1-month follow-up. After 2 months the desired result was achieved. 19 × 25 stainless steel rectangular wire used for retention for 6 months. (Fig 1-3)

Figure-1 Pre-treatment photo (front view)

Figure-2 Post-treatment photo (front view)

Figure-3 Post-treatment photo (occlusal view)

Discussion

The 2x4 appliance can be used as soon as the permanent incisors and first permanent molars have erupted into the oral cavity. It is used to correct various malocclusions during the mixed dentition period associated with the permanent incisors such as crossbite, increased overjet, ectopic eruption, and rotations. The permanent central incisors are bonded and the permanent molars are banded along with a molar tube in which the continuous archwire is inserted.[5]

The main advantage of the versatile 2 x 4 appliance is that it reduces the need for patient co-operation. Better patient compliance can be achieved using this appliance than a removable appliance. It produces minimal discomfort and increased control of tooth movement in all three planes of space.[6] Moreover, it is a single visit procedure and no laboratory work is needed which is beneficial for both clinician and patients. The application of force is lesser than the conventional fixed orthodontic treatment. A proper arch form and controlled force for the tooth movement are achieved. It corrects the malocclusion thereby it improves the self-esteem of the patient at an early age.[7]

The disadvantage of 2 x 4 appliance is the banding on the first permanent molars. Banding could be difficult if the first permanent molar is not fully erupted into the oral cavity or if its clinical crown is short. Also, banding increases the risk of dental caries as it interferes with cleaning. Good oral health must be maintained throughout the treatment period.[12]

The present article describes a successful case treated using 2 x 4 appliance in a patient with Angle's class I molar relation with upper anterior teeth proclination. Early treatment was planned and achieved to reduce the psychological trauma associated with malocclusion.

Maxillary anterior teeth proclination has to be treated as early as possible because there is a direct relationship exists between increased overjet and dental trauma. Proclined upper incisors are more prone to be fractured.[13] Children with increased overjet have higher chances of dental trauma than children with any other malocclusion. Increased overjet was 1.57% more likely to cause greater esthetic impact, especially in girls.[14] In general, the upper anterior teeth proclination is believed to occur as a consequence of the presence of an abnormal oral habit such as thumb sucking, tongue thrusting. As already mentioned, no abnormal oral habits were detected in this case. Hence, the proclination of incisors must be due to the ectopic eruption of the upper incisors.

Treatment was initiated using 014 NiTi wire. At 1 month follow up 016 NiTi wire was placed. The results were achieved in a shorter duration of 2 months. 19 x 25 rectangular stainless steel wire was placed for retention for a period of 6 months. The treatment was completed in 8 months. No relapse was reported at 6-month follow-up.

Case selection is an important criterion in 2x4 appliance. The clinician should have a sound knowledge of using this fixed handy appliance during the mixed dentition period. This is because many self-correcting anomalies exist in the mixed dentition period which will be corrected after the transition happens. So, a thorough assessment of the patient's facial and dental profile should be performed to make an appropriate diagnosis and treatment plan.

Conclusion

Certain dental malocclusions can be corrected immediately after the eruption of permanent incisors and need not wait until the eruption of all the permanent teeth. The 2 x 4 appliance is an easy-to-use, handy appliance. It provides functional improvement with psychological benefits at an early stage of life.

References

1. Bhola M and Gera T. Orthodontic Intervention In Mixed Dentition: A Boon for Pediatric Patients. IDA Lud J –le Dent 2018;2(2):10-16.

2. Kushwah A, Kumar M, Jaiswal A, Shailesh T. An Introduction to interceptive orthodontics. TUM J Dent 2017;4(3):118-120.

3. Nabarrette M, Brunheroto J, Dos Santos PR, Meneghim

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MD, Vedovello SA. Esthetic impact of malocclusions in the anterior segment on children in the mixed dentition. American Journal of Orthodontics and Dentofacial Orthopedics. 2021 Jan 1;159(1):53-8.

4. Dowsing P, Sandler PJ. How to effectively use a 2× 4 appliance. Journal of orthodontics. 2004 Sep 1;31(3):248-58.

5. Fiona McKeown H, Sandlerd J. The two by four appliance: a versatile appliance. Dental update. 2001 Dec 2;28(10):496-500.

6. Soni S, Bafna Y, Choksi K, Patel J, Kotadiya J. Early orthodontics interception in mixed dentition using 2x4 appliance: a series of 3 case report. J Med Sci Clin Res. 2019;7(1):44-9.

7. Shyamala Naidu and Anand Suresh. The Applications of 2 x 4 Appliance During Mixed Dentition Treatment. Acta Scientific Dental Sciences 2.11 (2018): 49-51.

8. Ilisulu C, Uz S, Koruyucu M, Seymen F. Early interceptive orthodontic treatments: case series. International Journal of Medical Investigation. 2019 Sep 10;8(3):104-11.

9. Verma J, Ahuja V. Interception of developing anterior malocclusion due to supernumerary tooth by "2 x 4 Appliance": A clinical case report. The Journal of Dental Panacea. 2021 Jun 15;3(1):40-5.

10. Mustapha NM, Ashari A. Simplified Fixed Technique for Correction of Anterior Crossbite: A Case Series. Archives of Orofacial Science. 2021 Jun 1;16(1).

11. Watted A, Awadi O, Watted N, Abu-Hussein M. Impacted Maxillary Central Incisors: Surgical Exposure and Orthodontic Treatment: A Case Report. J Oral Health Dent Res. 2021;1(1).

12. Zaghrisson BU, Zachrisson S. Caries incidence and oral hygiene during orthodontic treatment. European Journal of Oral Sciences. 1971 Aug;79(4):394-401.

13. Jarvinen S. Incisal overjet and traumatic injuries to upper permanent incisors: A retrospective study. Acta Odontologica Scandinavica. 1978 Jan 1;36(5-6):359-62.

14. Keles F, Bos A. Satisfaction with orthodontic treatment. Angle Orthod. 2013; 83(3):507–511.

Role of Videonystagmography in Patients of BPPV

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Abstract

Videonystagmography (VNG) is a complete diagnostic system for recording, analyzing, and reporting eye movements using video imaging technology, in which hi-tech video goggles with infrared cameras are used. VNG includes a series of tests used to determine whether a vestibular disease may be causing a balance or dizziness problem; VNG can differentiate between a central and a peripheral vestibular lesion, and, if peripheral, it can decipher between unilateral and bilateral vestibular loss. VNG addresses the functionality of each ear.

Keywords: dizziness, vestibular lesion, vertigo,canaliths

Introduction

Benign paroxysmal positional vertigo (BPPV) is a common vestibular disease that can originate from any of the semicircular canals (SCCs). The posterior canal (PC), being the most gravity-dependent part of the vestibular labyrinth, is most commonly associated with BPPV (80–90%). With head movements, free-floating canaliths/otoliths/otoconia (debris in the endolymph) can migrate from the utricular otolithic membrane into the posterior semicircular canal through its nonampullated end (You et al., 2018).[1]

A Germany based study reported the lifetime prevalence of BPPV to be 3.2% in females, 1.6% in males and 2.4% overall (von Brevern et al., 2007). In the Indian rural population, the prevalence of otologic vertigo and BPPV is 0.08% and 0.05%, respectively (Abrol et al., 2001). In India, BPPV is more prevalent over the age of 45 years with a female preponderance (Swain et al., 2018).[2]

The otoconia, calcium carbonate crystals, are embedded in the macula of the utricle and saccule. In BPPV, these are thought to accumulate in the SCC from the utricle, making them abnormally sensitive to gravity, which can lead to abnormal displacement of cupula and stimulation of corresponding vestibular afferents when head position changes with respect to gravity, resulting in nystagmus and vertigo (Schuknecht, 1969).[3]

There are two theories explaining the possible pathophysiology. The "cupulolithiasis"

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theory suggests that the cupula, which becomes heavy due to attached otoliths, can be deflected by changes in head position thus causing nystagmus (Schuknecht, 1969). The "canalolithiasis" theory suggests that otoliths from the utricle migrate into the semicircular canal, evoking nystagmus and vertigo by moving freely inside the canal during changes of head position (Hall et al., 1979). Pathological studies have yielded evidence for both theories (Lee and Kim, 2010).[4]

Dix Hallpike test is the gold standard test for PC-BPPV with characteristic nystagmus. The latency between the start of the test and the onset of nystagmus is about 2–5 s and due to the inertia of canaliths. Once canaliths migrate to the most dependent part, the nystagmus terminates. BPPV is generally managed nonsurgically with canalith repositioning maneuvers (CRMs). For PC-BPPV, certain maneuvers, e.g. Semont's and Epley's maneuvers, have been developed. Epley described the positional maneuver (Epley's manoeuvre) based on the canalolithiasis theory, which helps with the return of canaliths from the posterior canal back to the utricle (You et al., 2018; Lee and Kim, 2010).[5]

Videonystagmography (VNG) includes a test series to diagnose and report vestibular diseases causing vertigo. It is useful to support diagnosis and to document unilateral/bilateral loss of vestibular function, as well as to detect central lesions that may have been missed during physical examination (Mekki, 2014).

Material and Methods

The study was conducted at the Department of ENT & HNS, Adesh insistute of medical research , Bathinda with approval from the institutional ethics committee for a period of six months (from jan 2022 to june 2022) involving 30 patients with BPPV.

Patients visiting the out-patient department (OPD) were registered and demographic data including name, age, sex, address, phone number, etc. were recorded along with appropriate history of giddiness and associated co-morbidities. General physical and otorhinolaryngology (ORL) examinations were completed. All patients were pure tone audiometry to document hearing thresholds and

to rule out pathologic causes of vertigo other than BPPV.

Among patients visiting the OPD, 30 patients diagnosed with BPPV were conveniently recruited for the study. All the patients were explained about the study and an informed consent was taken. Patients with vertigo not related to BPPV, with a history of ototoxic medication usage, loud noise exposure, consumption of drugs or alcohol within 72 h of the study including vestibular or labyrinthine inhibitors, and with any ophthalmologic, musculoskeletal or neurological diseases were excluded from the study.

Videonystagmography (VNG) test was completed with proper calibration using the Balance Eye goggles with infrared cameras and software modules designed by Cyclops Medtech Private Limited in the vestibular lab. VNG tests included spontaneous and gaze induced nystagmus and oculography tests (smooth pursuit, saccadic and optokinetic eye movements) to rule out central vestibular pathologies.

A positioning test was also performed using the VNG equipment, which included the Dix Hallpike maneuver for diagnosis of PC-BPPV. Patients with positive Dix Hallpike test were considered for further evaluation in the study. Dynamic subjective visual vertical test was done using the VNG equipment soon after positive Dix Hallpike test (i.e. in an acute episode of PC-BPPV),

Data entry was done using Microsoft Excel and statistical analysis was done using the Statistical Package for Social Sciences software-21 (SPSS-21). while quantitative data were presented as mean ± SD and as median with 25th and 75th percentiles (interquartile range). Paired t-test was used for comparison of SVV values. For statistical analysis, a p-value of less than 0.05 was considered significant.

Results

All 30 patients were between 28 and 66 years of age (mean = 48.60 years. There were 14 males and 16 females (Male: Female = 1:1.28). All patients had symptoms within 12–72 h of the initial visit (mean = 24 h).

In all but two patients, history of BPPV was shorter

than 2 years. All patients were hemodynamically stable and had normal otorhinolaryngology examinations. Tympanogram was type A bilaterally in all patients, indicating normal middle ear function. Pure tone audiometry thresholds were normal in 25 patients, showed bilateral high frequency sloping sensorineural hearing loss (SNHL) in 3 patients, bilateral mild SNHL at 2000, 4000 and 8000 Hz in 1 patient and bilateral moderate SNHL at 2000, 4000 and 8000 Hz in 1 patient who was also using hearing aids in both ears.

Dix Hallpike test was positive for the right side in 19 patients and positive for the left side in 11 patients. SVV deviated towards the affected ear in all of these patients. Table 2 shows dynamic SVV readings in the 30 patients before and after CRM and following resolution of PC-BPPV, without consideration of deviation direction. SVV deviation was at or greater than the normative value of 2.0° in 17 patients (56.66%) before CRM (average 2.0467+/-0.4160° for the group). After CRM, SVV readings in all patients were below 2.0° (average 1.2367+/-0.2029° for the group).

At follow-up on day 3, 7 patients reported persistent symptoms of PC-BPPV and therefore received, repeated CRM with no immediate additional SVV tests. These patients had all demonstrated a reduction of SVV deviation immediately after the initial CRM [Table 2].

On the second follow-up visit after 2 weeks, all patients were free of symptoms (i.e. complete resolution of PC-BPPV), with additional reduction of SVV deviation (average 0.8290+/-0.2104° for the group)

Reduction of SVV deviation after CRM, as compared to before CRM, was statistically significant (P < 0.0001). Reduction of SVV deviation after complete resolution of PC-BPPV, as compared to before CRM, was also statistically significant (P < 0.0001).

Immediately post-CRM, distribution pattern of direction of SVV deviation was not significantly different than before CRM, with only 3 patients showing no prevalence of deviation direction. After complete resolution of PC-BPPV, the number of patients showing no prevalence of deviation direction increased to 10.

Discussion

BPPV is a very common vestibular disease resulting from displacement of otoliths from the utricle into any of the SCCs. It is diagnosed by proper clinical history and Dix Hallpike test, and managed most commonly by Epley's CRM.

PC-BPPV can either be related to dysfunction of the utricle because of macular degeneration or to displacement of otoliths into posterior SCC or both, because several post mortem studies revealed signs of unilateral utricular damage on the side of BPPV (von Brevern et al., 2006). Utricular function can be assessed by SVV, which tests a person's ability to perceive gravitational vertical. Previous studies on SVV in patients with PC-BPPV diverge widely. While a few studies found no alteration, other studies showed altered SVV in a significant number of patients (El-Minawi et al., 2019). In the Indian population, the normative limits for SVV is ± 2.5° (Ashish et al., 2016). In our study, the normative SVV value using the Balance Eye VNG equipment was set at ± 2°, in accordance with the SVV normative data published by Akin et al. (El-Minawi et al., 2019; Akin et al., 2011; Böhmer and Rickenmann, 1995) A few studies have shown that there is a significant difference in SVV results between BPPV patients and healthy individuals (Faralli et al., 2011; El-Minawi et al., 2019; Sapountzi et al., 2017; Ferreira et al., 2017).

During an acute episode of BPPV, there can be direct stimulation of the posterior canal or possible damage to the utricular macula that can alter SVV test results. Vertigo can be explained by the presence of otoliths detached from the utricular macula in any of the canals (posterior SCC in this study). To conclude, otoliths that are responsible for vertigo likely have a direct or indirect role in SVV alteration (von Brevern et al., 2006).

In our study, mean SVV deviation was 2.05 ± 0.42° before CRM, which dropped to 1.24 ± 0.20° immediately after CRM (p < 0.0001), indicating a significant reduction in SVV deviation in a significant number of patients as compared to the acute phase of the disorder. Consistent to some of the existing

studies (van Nechel et al., 2001; Boleas-Aguirre et al., 2005; Chetana and Jayesh, 2015), the direction of SVV deviation pointed to the affected side in all of our patients, although this does not agree with some other studies that reported a direction of SVV deviation to the contralateral side (Faralli et al., 2011; Böhmer and Rickenmann, 1995; van Nechel et al., 2001).

More than half of our patients (56.66%) had an angle of SVV deviation of more than the set normative value of 2° during acute episodes of BPPV. In those patients showing deviation less than 2° during the acute episode, their utricular dysfunction or disease might be less extensive. After CRM, SVV deviation in all of the patients, including those demonstrating greater than normal deviation earlier, decreased to a level below the set normative value, suggesting a favorable effect of the CRM.

Changes of SVV readings during follow-ups may be indicative of a dynamic relationship between canaliths and the utricle. The angle of SVV deviation in patients with PC-BPPV reflect dysfunction of a utricle that has lost otoliths from its macula or direct stimulation of the posterior semicircular canal by otoliths. We can probably assume that free otoliths, after being removed from the semicircular canal through CRM, may return to the macular structure and help restore its function with other secondary benefits (Faralli et al., 2011; El-Minawi et al., 2019; von Brevern et al., 2006; Sapountzi et al., 2017; Ferreira et al., 2017). In all of our cases, utricular dysfunction appeared to be brief, as normalization of SVV occurred within a couple of weeks. This may also support the efficacy of CRM in macular repair.

Conclusion

It is assumed that, in PC-BPPV, otoliths are detached from the utricle and enter the posterior SCC causing the symptoms. A significant loss of otoconia in the utricular membrane leads to decreased stimulation of sensory receptors and causes SVV to tilt to the affected side, as shown in this study using VNG equipment during the acute phase of PC-BPPV. Although SVV deviation was not always greater than 2° in our patients, it consistently decreased after CRM and completely normalized in all of our patients after 2 weeks with complete

resolution of PC-BPPV, suggesting that utricular dysfunction was brief, as well as possible efficacy of CRM in the repair of the otolithic membrane in the utricle. SVV test can therefore be used as a prognostic marker for CRM in patients with PC-BPPV. However, the possibility of SVV deviation due to direct posterior canal stimulation by otoliths should not be neglected.

One limitation of this study is its relatively small sample size of only 30 patients and lack of a healthy control group for comparison. Because of the small sample size, further studies with large sample size, and inclusion of a control group, are needed to confirm our findings. In place of the normal control, SVV readings after complete resolution of PC-BPPV might serve as normative values in this study, as the patients were symptom free with no residual giddiness at this time point.

Future studies may also assess SVV in patients with other types of BPPV and recurrent BPPV. o-VEMP may also be included in assessment of utricular dysfunction. Unilateral centrifugation for utricular function assessment may be combined with SVV test to confirm the results of the current study.

References

1. Barber HO, Stockwell CW. Manual of electronystagmography (1st ed.). St. Louis, MO: Mosby 1976.

2. Bhattacharyya N, Baugh RF, Orvidas L, Barrs D, Bronston LJ, Cass S, Haidari J. Clinical practice guideline: Benign paroxysmal positional vertigo. Otolaryngology — Head & Neck Surgery, 2008; 139 (5 Suppl. 4):S47–S81.

3. Furman JM, Cass SP. Benign paroxysmal positional vertigo. New England Journal of Medicine, 1999; 341: 1590–1596.

4. Campbell K. Essential Audiology for Physicians. San Diego: Singular Publishing Group; 19

5. Jacobson GP, Newman CW, Kartush JM. Handbook of Balance Function Testing. San Diego: Singular Publishing Group; 1993.

Relationship between Anxiety Levels and Prevention Attitudes Toward COVID-19 Transmission Among Pregnant Women

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Abstract

Backgrounds: Pregnant women are classified in a group that is vulnerable to the transmission of COVID-19 infection. Anxiety of pregnant women during COVID-19 pandemic can hinder pregnancy plans and increase anxiety of pregnant women. The anxiety of pregnant women could lead them to have a positive healthy attitude, namely by following the health protocols implemented by the government.

Aim: This study is aimed to determine the relationship between anxiety levels and prevention attitudes toward COVID-19 transmission among pregnant women.

Methodology: This type of research is quantitative analytic with a cross sectional approach using the HARS anxiety questionnaire to determine the anxiety levels of pregnant women and prevention attitude questionnaire toward COVID-19. Research was carried out at Sri Wartini Community Medical Center in Bogor City with a sample of 40 pregnant women. The sampling technique used was total sampling. The data analysis technique used statistical test with chi-square test.

Results: Among 40 participants, 24 (60%) participants had positive prevention attitudes toward COVID-19 and 16 (40%) participants had negative prevention attitudes toward COVID-19 transmission, whereas 15 (37.5%) participants had mild anxiety and positive prevention attitudes toward COVID-19 transmission. The p-value of this research was 0.000.

Conclusion: There was significant relationship between anxiety levels and prevention attitudes toward COVID-19 transmission among pregnant women.

Keywords: Anxiety levels, COVID-19, Pregnant women, Prevention attitude, Transmission

Introduction

According to WHO (2020), COVID-19 is an infectious disease caused by the newly discovered Corona Virus.[1]

In Indonesia, COVID-19 caused many people to feel more anxious being contracted with the disease. COVID-19 cases in Indonesia as of August 8, 2021 have reached 3,666,031 people with 107,096 people were declared dead due to exposure to this virus

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while 3,084,702 people were declared cured from the disease.[2]

According to WHO, pregnant women and fetuses are included in the population at high risk during outbreaks of infectious diseases.[3]

Indonesian Association for Obstetrics and Gynecology recorded that there were 536 pregnant women confirmed to be exposed to COVID-19 and about 3% of that number were declared dead during April 2020 to April 2021.[4] Based on data from the Bogor City Health Department, throughout 2020 there were 64 pregnant women who were confirmed to have been exposed to COVID-19, 13 newly give birth mothers and 4 breastfeeding mothers were exposed to COVID-19.[5]

Pregnant women are one of the groups that are susceptible to health problems, especially infectious diseases due to changes in body physiology and immune response mechanisms in their bodies.[6] According to data from the Indonesian Association for Obstetrics and Gynecology, 13.7% of pregnant women were more easily infected with COVID-19, compared to those who are not pregnant. Pregnant women who were aware of this fact experienced their anxiety level increasing and eventually the pregnancy plans got hindered as well.[4,7]

Methodology

The type of research used was *analytical quantitative* with a cross sectional approach.[9] The number of samples were 40 participants with inclusion criteria, namely pregnant women who had Ante Natal Check-ups (ANC) at Sri Wartini Community Health Center of Bogor City and willing to be a participant. The exclusion criteria were pregnant women who did not have Ante Natal Check-ups (ANC) and those who were not willing to be participants. Coding is carried out starting from participants 1 to 40. The sampling technique used was total sampling with chi square test.

After obtaining research permit to conduct the study from the Sri Wartini Community Health Center, the researchers met the participants to get their consents and explain the instruments used in the study. The types of data collected in this study were primary data through questionnaires and secondary data through records of pregnant women's visits to determine the number of pregnant women who underwent examinations at Sri Wartini Community Health Center.

The questionnaire included personal identity, anxiety questionnaire from the HARS (Hamilton Anxiety Rating Scale) and COVID-19 prevention attitude questionnaire with 10 statements that have been tested for validity and reliability.[10] Nominal data scale for COVID-19 prevention attitudes adapted Likert scales:

Positive statements:

- Strongly Disagree (score 1)
- Undecided (score 2)
- Agree (score 3),
- Strongly Agree (score 4).

Negative statements:

- Strongly Disagree (score 4)
- Undecided (score 3)
- Agree (score 2),
- Strongly Agree (score 1).

The scores were categorized as follows:

1. Positive attitude: if the value of T-score > mean (25,4).
2. Negative attitude, if the value of T-score < mean (25,4).

Results

Data collection was carried out on 18 May - 14 June 2022. Most participants aged less than 30 years old with a total of 24 participants (60%) and most participants worked as housewives with a total of 28 participants (70%).

Table 1. Frequency Distribution of Anxiety Levels in Pregnant Women

Anxiety Level	Frequency	Percentage (%)
No anxiety	7	17.5
Mild anxiety	18	45
Moderate anxiety	12	30
Severe anxiety	3	7.5
Total	40	100

Based on table 1, most of the participants had mild level of anxiety, with a total of 18 participants (45%), while severe anxiety was found in 3 participants (7.5%).

Table 2. Frequency Distribution of Prevention Attitudes toward COVID-19 Transmission in Pregnant Women

Attitude	Frequency	Percentage (%)
Positive	24	60
Negative	16	40
Total	40	100

Table 2. showed that 24 participants (60%) showed positive prevention attitude toward COVID-19 transmission and 16 participants (40%) showed negative prevention attitude toward COVID-19 transmission.

Table 3. The Relationship between Anxiety Levels and Prevention Attitudes Toward COVID-19 Transmission Among Pregnant Women

| Anxiety Level | Attitude | | | | Total | | P-value |
| | Positive | | Negative | | | | |
	F	%	F	%	F	%	
No Anxiety	7	17.5	0	0	7	17.5	
Mild Anxiety	15	37.5	3	7.5	18	45.0	0.000
Moderate Anxiety	1	2.5	11	27.5	12	30.0	
Heavy Anxiety	1	2.5	2	5	3	7.5	
	24	60	16	40	40	100	

Based on table 3, out of 40 participants, there were 15 (37.5%) pregnant women with mild anxiety levels and positive prevention attitude toward COVID-19 transmission and 11 participants (27.5%) had moderate anxiety and negative prevention attitude toward COVID-19 transmission.

Statistical data used the Chi-square analysis test with p-value of 0.000. The result indicated there was a significant relationship between anxiety levels and prevention attitude toward COVID-19 transmission among pregnant women at Sri Wartini Community Health Center of Bogor City.

Discussion

a. Anxiety Levels of COVID-19 Transmission in Pregnant Women

Based on the results of the frequency distribution table 1, it can be depicted that out of 40 participants, 18 participants (45%) had mild anxiety level and 3 participants (7.5%) were found with severe anxiety level.

This finding is in line with research conducted by Citra Dewi Ayu, et al. (2021) regarding anxiety in pregnant women during the COVID-19 pandemic at Ibnu Sutowo Baturaja Hospital, with the result of majority of participants (29.7%) experienced mild anxiety level. [11]

In general, there are two factors that influence anxiety level in pregnant women, namely internal factors and external factors. Internal factors are divided into two types: beliefs about childbirth and feelings before childbirth.[12] In addition to internal factors, external factors are also divided into two types: information from health workers and husband's support.[13]

Belief in internal factors is a response to believe or not believe from pregnant women about stories or myths heard from other people or developing in the area where they live. Meanwhile, the feeling before delivery is related to the feeling of fear or not being afraid of the mother before delivery.[14] Information from health workers is an important external factor for pregnant women because the information obtained can affect the level of anxiety of pregnant women in facing childbirth. The complete information obtained regarding further conditions regarding her pregnancy, including the presence of

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comorbidities in pregnancy, makes pregnant women more prepared for all the possibilities that will occur during childbirth. Thus, pregnant mothers will not be burdened with feelings of fear and anxiety. In addition, information from health workers and husband's support play an important external factor for pregnant women.[15] Meanwhile, there are also biological factors and psychological factors that affect anxiety in pregnant women. Biological factors include health and strength during pregnancy as well as smooth delivery of the baby. Psychological factors such as mental readiness of pregnant women to give birth, which includes various feelings of anxiety, tension, happiness, as well as problems such as miscarriage, appearance and ability to give birth.[16]

Psychosocial changes that occur in pregnancy are a response to the physiological disturbances that occur and the increased responsibility associated with the presence of new individuals who have not been able to be independent. A person may begin to feel afraid of the pain and physical harm that comes with giving birth.[17]

Mild anxiety related to tension about daily life events. Mild anxiety symptoms can be identified as occasional shortness of breath, increased pulse and blood pressure, mild gastric symptoms, facial wrinkles and tremors, ringing in the ears, increased alertness, expanded perceptual field, difficulty concentrating on problems effectively, unable to sit still and hand tremors. Pregnant women who experience mild anxiety related to tension in daily life could experience unexpected changes in the field of perception.[18]

b. Prevention Attitude of COVID-19 Transmission Among Pregnant Women

Based on the results of the frequency distribution table for the transmission of COVID-19 in pregnant women at Sri Wartini Community Health Center, most of the participants had positive attitude with a total of 24 (60%) participants.

This is in accordance with the research of Cesar Cuadra et al. (2021), which stated that almost all of the participants had carried out health management very well in preventing COVID-19 among pregnant women. Pregnant women are very aware of the severe

risks as a result of COVID-19 and this make them to be very compliant to follow the health protocols and have a positive attitude toward preventing COVID-19 transmission. Pregnant women are worried that contracting COVID-19 will have bad impacts on their babies.[19]

The results in this study showed that there were more pregnant women who had positive attitude toward COVID-19 prevention than the ones with negative attitude. This condition was influenced by the level of education and broad knowledge regarding COVID-19 transmission. If there is pregnant woman who showed a negative prevention attitude toward COVID-19 transmission, this could happen due to a lack of support from the surrounding community and family or lack of self-awareness.

Characteristics of participants in the form of education level are factors that influence the attitude of pregnant women in maintaining health related to COVID-19 prevention. Based on the results of the study, the education of the most participants were Higher Education, with a total of 26 participants (54%). A person's level of education can affect the quality of her life, including how to prevent COVID-19 transmission. One of the goals of education is to change human behavior, which is in line with changes in knowledge and attitudes.

c. The Relationship between Anxiety Levels and Prevention Attitude toward COVID-19 Transmission in Pregnant Women

Based on table 3, the Chi-square test showed that the value with the results of Asymptotic Significance (2-sided) 0.000 < = 0.05. Thus, it can be concluded that there was a significant relationship between the anxiety levels and prevention attitude toward COVID-19 transmission among pregnant women.

This research is in accordance with research conducted by Ding et.al (2021). The research examined 74 participants with 18 pregnant women had negative attitudes toward COVID-19 prevention.[20]leading to adverse health outcomes for mothers and children. The study aimed to evaluate the sociodemographic characteristics, knowledge, attitudes, and practices (KAP Chidebe et.al (2021) stated that negative attitudes occur due to lack of

support from the surrounding community and family, or lack of awareness of the individual himself so that it affects behavior in daily life.[21]attitude, and degree of anxiety towards COVID-19 and its predictors among pregnant women in Ebonyi State, Nigeria. Materials and Methods: This cross-sectional study was conducted between April and July 2020 on 460 pregnant women randomly selected from three hospitals in the state. Data was collected using a structured questionnaire and a Coronavirus Anxiety Scale. Data were analyzed using IBM SPSS version 20 and were represented using a frequency table, percentages, and odds ratios. Results: The mean gestational age and maternal age of the respondents were 33.5 (95% CI 31.9-35.2

Anxiety of pregnant women during the COVID-19 pandemic can hamper pregnancy plans and increase the anxiety of most pregnant women. They often question the impact of COVID-19 virus on the birth of a baby. To avoid exposure to COVID-19, it is necessary to take important precaution steps in order to stop the transmission of the virus.[20]leading to adverse health outcomes for mothers and children. The study aimed to evaluate the sociodemographic characteristics, knowledge, attitudes, and practices (KAP Early detection of anxiety in pregnant women is very crucial step in preventing COVID-19 transmission. Anxiety during pregnancy must be handled properly so that the immune system of the mother and baby remains strong, especially in avoiding the transmission of COVID-19 disease. However, anxiety can also have a positive impact on the level of alertness of pregnant women in preventing the transmission of COVID-19. By having positive anxiety, pregnant women can be more motivated to follow applicable health protocols and reduce risk factors for COVID-19 transmission.

Conclusion

There was a significant relationship between anxiety levels and prevention attitudes toward COVID-19 transmission among pregnant women at Sri Wartini Community Health Center of Bogor City.

Ethical Clearance: No ethical clearance was required.

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Conflicts of Interest: There was no conflict of interest in the research.

References

1. WHO Coronavirus Disease (COVID-19) Dashboard. Bangladesh Physiother J. 2020;

2. Central Bureau of Statistics. Analysis of COVID-19 Impact Survey Results. Analysis of the Impact of the COVID-19 Survey on Business Actors. 2020.

3. Kotlar B, Gerson E, Petrillo S, Langer A, Tiemeier H. The impact of the COVID-19 pandemic on maternal and perinatal health: a scoping review. Vol. 18, Reproductive Health. 2021.

4. COVID-19 GTPP. Practical Guidance Protocol for Maternal and Newborn Health Services During the COVID-19 Pandemic. Protocol for the Task Force for the Acceleration of Handling COVID-19 RI [Internet]. 2020;4(April):1–11. Available from: https://COVID19.go.id/p/protokol/protokol-b-4-petunjuk-praktis-layanan-kesehatan-ibu-dan-bbl-pada-masa-pandemi-COVID-19

5. Bogor City Health Office. Bogor City Health Office Profile 2019. Bogor City Health Office [Internet]. 2019;1689–99. Available from: https://dinkes.kotabogor.go.id/document

6. Villar J, Ariff S, Gunier RB, Thiruvengadam R, Rauch S, Kholin A, et al. Maternal and Neonatal Morbidity and Mortality among Pregnant Women with and without COVID-19 Infection: The INTERCOVID Multinational Cohort Study. JAMA Pediatr. 2021;175(8):817–26.

7. Maharlouei N, Keshavarz P, Salemi N, Lankarani KB. Depression and anxiety among pregnant mothers in the initial stage of the Coronavirus Disease (COVID-19) pandemic in the southwest of Iran. Reprod Health. 2021;18(1).

8. Zainiyah Z, Susanti E. Anxiety in Pregnant Women During Coronavirus (COVID-19) Pandemic in East Java, Indonesia. Maj Kedokt Bandung. 2020;52(3):149–53.

9. Hardani, Auliya NH, Andriani H, Ustiawaty RAFJ, Utami EF, Sukmana DJ, et al. Book of Qualitative and Quantitative Research Methods. Science Library. 2015.

10. Wawan A DM. Theory and Measurement of Human Knowledge, Attitudes and Behavior. Knowledge, Attitudes, and Human Behavior Complete with Sample Questionnaire. Noah Medika. 2015. p. 16–7.

11. Pada K. Pregnant Mother, DI Period, COVID P. Anxiety in pregnant women during the COVID 19 pandemic at the Ibnu Sutowo Baturaja Hospital. J SMART Nursing. 2021;8(1):64–9.

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12. Nowacka U, Kozlowski S, Januszewski M, Sierdzinski J, Jakimiuk A, Issat T. COVID-19 pandemic-related anxiety in pregnant women. Int J Environ Res Public Health. 2021;18(14).

13. Noviyana A, Kurniati CH. Relationship between Knowledge, Attitudes and Behavior of Pregnant Women on Non-compliance in Consuming Blood-Adding Tablets at the Health Center of Purwokerto Barat Banyumas. J Midwifery Hope Mother Pekalongan. 2018;3:53–7.

14. Nugroho T. Textbook of Midwifery Care 1. Vol. 8, Yogyakarta : Nuha Medika. 2019. p. 4.

15. Ummah F dkk. Health education and health promotion. Risnawati, editor. Bandung: Media Sains Indonesia; 2021.

16. Notoatmodjo. Concept of Knowledge and Attitude. Cell. 2014;

17. Liu J, Hung P, Alberg AJ, Hair NL, Whitaker KM, Simon J, et al. Mental health among pregnant women with COVID-19–related stressors and worries in the United States. Birth. 2021;48(4):470–9.

18. Hawari D. Stress, Anxiety and Depression Management. Jakarta: Balai Penerbit FKUI; 2013.

19. Cuadra-Sánchez C, Rivero A, Cabrera C, Faneite P, de Gracia PV. Prevention of COVID-19 in pregnant women, eventual use of new vaccines. Gac Med Caracas. 2021;129(2):421–8.

20. Ding W, Lu J, Zhou Y, Wei W, Zhou Z, Chen M. Knowledge, attitudes, practices, and influencing factors of anxiety among pregnant women in Wuhan during the outbreak of COVID-19: a cross-sectional study. BMC Pregnancy Childbirth. 2021;21(1).

21. Anikwe CC, Ogah CO, Anikwe IH, Ewah L, Onwe OE, Ikeoha CC. Coronavirus 2019 Pandemic : Assessment of the Level of Knowledge , Attitude , and Anxiety among Pregnant Women in Ebonyi State , Nigeria. Ann Med Health Sci Res. 2021;4(2):1267–73.

22. Maharlouei N, Asadi N, Bazrafshan K, Roozmeh S, Rezaianzadeh A, Zahed-Roozegar MH, et al. Knowledge and attitude regarding COVID-19 among pregnant womenin southwestern Iran in the Early period of its outbreak: A cross-sectional study. Am J Trop Med Hyg. 2020;103(6):2368–75.

Burden of COVID-19 Risk in the Municipalities of East Java Province, Indonesia, and its Associated Factors: Spatial Analysis Approach

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Abstract

East Java Province has the fourth-highest number of COVID-19 cases among all other provinces Indonesia. This study aimed to examine the spatial effect on confirmed cases of COVID-19 and the risk factors. Data were analyzed using Geoda software to obtain Global Moran's Index and Local Spatial Autocorrelation (LISA) and QGIS 2.8.1 software to make a map. Moran's I scatter plots also used to exploring the bivariate association between COVID-19 cases and potential predictors. The Global Moran's I statistics value shows spatial clustering in COVID-19 cases across the municipalities of East Java Province (Moran's I=0.3986). A positive spatial autocorrelation was observed between COVID-19 cases and population density (Moran's I = 0.2059), vaccination coverage (Moran's I = 0.322), the number of laboratories (Moran's I = 0.2322), ratio of health worker (Moran's I = 0.1617), and household (Moran's I = 0.0866). In comparison, a negative spatial correlation was observed between COVID-19 cases and The Enforcement of Restrictions on Community Activities' levels (Moran's I = -0,2420), average number of family member (Moran's I = 0.0115). The LISA cluster map shows that there were 3 hot spots (Surabaya, Gresik, and Sidoarjo) and 3 cold spots (Sampang, Pamekasan, and Sumenep).

Keywords: COVID-19, East Java, Local Spatial Autocorrelation, Moran's Index, spatial analysis

Introduction

The coronavirus disease 2019 (COVID-19) pandemic remains a priority problem facing the world. The virus appeared in December 2019 in Wuhan City, Hubei Province, China,[1] has spread to 227 countries, infected more than 489 million people, and caused more than 6.1 million deaths.[1] Its spread occurs in poor and developing countries and those most prepared for pandemics, according to the Global Health Security Index (GHSI), such as the United States and the United Kingdom.[2]

Indonesia was reported as the third-highest daily confirmed case of COVID-19 in the world on August 2021.[3] More than 50 thousand people were infected with the virus in a day.[1] The spike in cases occurred after the delta variants were found in several provinces,[4] and they have 60% greater transmission rate than the alpha variant.[5] One of the provinces that experienced a high spike was the East Java province, with a high spread in certain municipalities.[6]

Several studies stated that the spread did not occur randomly but in clusters, there is a strong

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spatial autocorrelation between one region and its neighbors.[7,8] A study in Indonesia showed a significant autocorrelation between provinces, where Moran's I was 0.269 (p-value 0.0004). It also found 5 provinces that had become COVID-19 hotspots, one of which was East Java.[7]

Researches in countries like India,[9] South Korea,[10] and Brazil[11] have shown similar results. Studies showing the higher prevalence of cases in big cities compared to small towns and rural areas proved that the intensity of the pandemic is shaped by population density.[12] However, the extensive spread is also made possible by other biological, environmental, and social factors[13] including the availability of health workers.[8] These risk factors are then explained through a spatial method to determine which locations should intervene.[13]

East Java Province has the highest number of municipalities on Java Island where this island contributes the most COVID-19 cases in Indonesia. Knowing the risk factors for COVID-19 in the region will help suppress the spread of cases which can have an impact on reducing cases nationally and preventing a wider spread. Therefore, this study was conducted to examine the spatial effect and identify municipalities in East Java with a high risk of COVID-19 cases and their factors.

Method

Data Resources

This study used cumulative data count of confirmed COVID-19 cases (28 June 2020 - 20 November 2021) in East Java Province as the dependent variable. The data was transformed to a natural logarithm form to make a normal distribution. This was obtained from the official website for COVID-19 Information. The independent variables were vaccination coverage, the ratio of health workers, number of laboratories, and the Enforcement of Restrictions on Community Activities' level (ERCA). In addition, vaccination coverage data was obtained from the Ministry of Health's COVID-19 Vaccination Status official website on the same date as the dependent variable. The data for health workers, number of households, household members, and laboratories were obtained from the Health Profiles

of East Java Province 2020 from the online sources. Meanwhile, the ERCA data was obtained from the Instruction of the Minister of Home Affairs No. 57 of 2021 concerning the Enforcement of Restrictions on Community Activities Level 3, Level 2, and Level 1 of COVID-19 in the Java and Bali regions. The unit of analysis for this study was the regency/city.

Statistical Analysis

This study used an ecological approach and was analyzed globally and locally. First, a global analysis was conducted to determine the spatial effect of COVID-19 confirmation cases in East Java Province using the univariate Global Moran's I and its correlation with the independent variables using the Global Moran's I bivariate test. Furthermore, a regional analysis was conducted to identify a municipality with a spatial effect and correlation with the independent variables in univariate and bivariate Local Indicators of Spatial Autocorrelation (LISA) tests. Queen contiguity determined the neighboring criterion. Data processing and mapping were conducted by Geoda and Quantum GIS version 2.8.1.

Global Moran's Index

The spatial effect of autocorrelation on the distribution of COVID-19 cases in East Java Province was determined by analyzing the Global Moran's Index data.

Global Moran's $I = \dfrac{\sum_{i=1}^{n} \; \sum_{j=1}^{n} \; w_{ij}(x_i - \underline{x})(x_j - \underline{x})}{\sum_{i=1}^{n} \; (x_i - \underline{x})^2}$

xi = i-th location variable data (i = 1,2, …, n)

xj = j-th location variable data (j = 1,2, …, n)

$\underline{x}$ = data average

I = Moran index

E(l) = expected value Moran's Index

There is a positive autocorrelation or a clustered distribution pattern when I > E(I) value. The area with a high number of cases is adjacent to those with an increased number. Meanwhile, when the value of I < E(I) means a negative autocorrelation or a spread distribution pattern, areas with a high number of cases tend to be surrounded by low cases. However, when there is no autocorrelation, it is random, and

the p-value indicates whether the autocorrelation occurs significantly or not. In this study, the value was declared significant when p < 0.05. In Moran's I global bivariate test, the value of I > E(I) indicates a positive spatial correlation between the Independent and dependent variables. The opposite meaning is when I < E(I).

Local Spatial Autocorrelation (LISA)

LISA provides information of quadrants that present four types of spatial autocorrelation, namely.[14]

a. High-High (HH): positive autocorrelation, the variables are distributed in clusters, both location and the neighbors have a high value.

b. High-Low (HL): negative autocorrelation, is an outlier, and location has a high outlier value among low neighbors.

c. Low-Low (LL): positive autocorrelation, cluster distribution, and locations have low values and are surrounded by neighbors with low values.

d. Low-High (LH): negative autocorrelation, is an outlier, and location has a low outlier value among neighbors who have a high value.

In this study, LISA was used to determine which municipalities have a significant spatial effect and the type of autocorrelation. The analysis output was displayed in the form of a significance map. This study conducted a univariate and bivariate LISA test.

Results

East Java Province consists of 38 municipalities, and the cumulative number of COVID-19 cases as of 20 November 2021 was 399,071, as shown in Figure 1. This indicates the darker the color, the higher the number of cases, and vice versa. Furthermore, there were similarities in color in adjacent districts, and the map also showed that confirmed cases tend to be higher (dark color) in the southern part of East Java Province.

Figure 1. The Distribution of COVID-19 Cases in East Java Province

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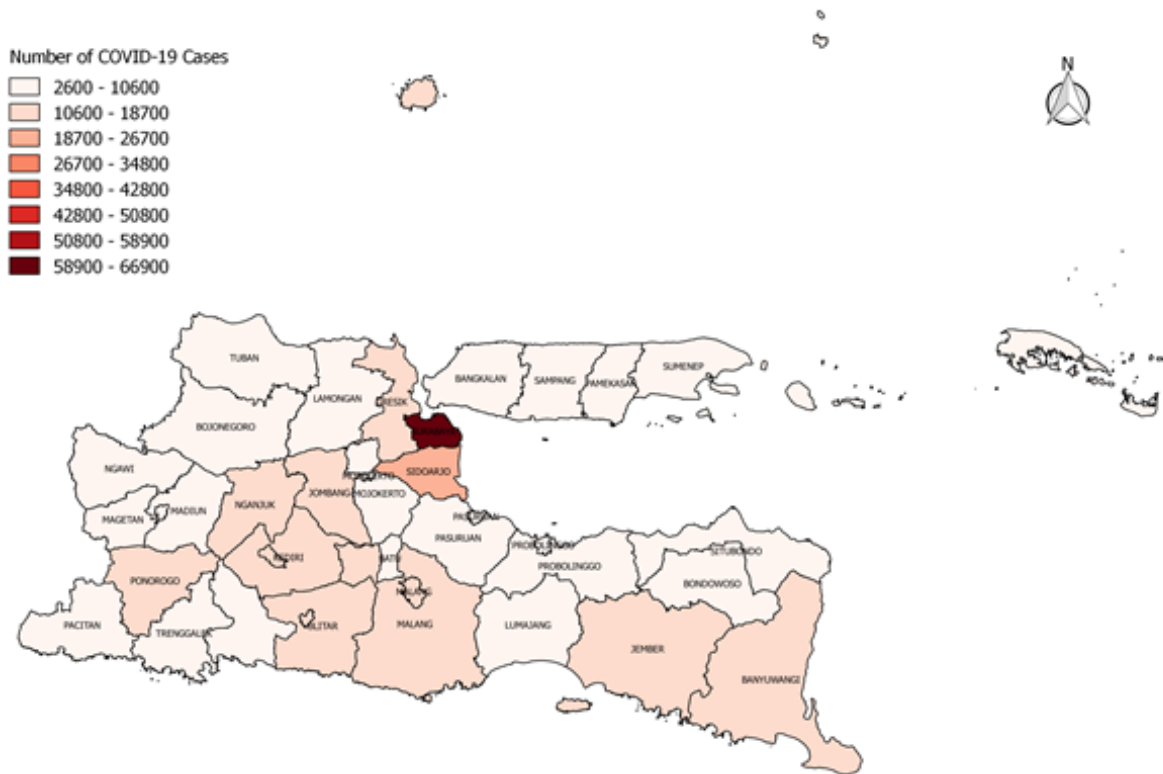
Figure 2. LISA Significance Map of COVID-19 Cases in East Java Province

The Global Moran's Index shows I = 0.3986 more significant than the expected value of E(I) = -0.0270, with a p-value of 0.001 indicating a significant positive spatial autocorrelation (α=0.05). Figure 2. shows the regional clustering based on COVID-19 cases using the LISA test. As a result, 3 municipalities had become hotspot areas with more COVID-19 cases than the global average or in the High-High quadrant, i.e., Surabaya, Gresik, and Sidoarjo. The Low-Low clusters or quadrants were Sampang, Pamekasan, and Sumenep.

Table 1 showed that there was a significant positive spatial interaction (I > E(I)) between vaccination coverage, population density, and number of laboratories related to cases in East Java Province with p-values of 0.001, 0.011, and 0.006, respectively. This indicated that high vaccination coverage tends to be spatially correlated with many COVID-19 cases, population density and the number of laboratories. The ERCA had a significant negative spatial interaction with the number of cases. This means a high level of Enforcement of Restrictions on Community Activities tends to be spatially correlated with a low number of COVID-19 cases.

Table 1. Moran's I Bivariate Test Results of COVID-19 Cases and the Risk Factors in East Java Province

Variable	I	E(l)	p-value
Vaccination coverage	0.3220	-0.0270	0.001*
Population density	0.2059	-0.0270	0.011*
The ERCA's levels	-0.2420	-0.0270	0.010*
Ratio of health worker	0.1617	-0.0270	0.064
Laboratories	0.2322	-0.0270	0.006*
Household	0.0866	-0.0270	0.171
Average number of family member	-0.0115	-0.0270	0.446

*p<0.05

Figure 3 shows municipalities with a spatially significant relationship between vaccination coverage, population density, number of laboratories, and the ERCA's level with the number of cases using the LISA bivariate test. The results showed that Surabaya, Gresik, and Sidoarjo were hotspot locations and had a significant positive spatial correlation between vaccination coverage and high population density with many COVID-19 cases. These municipalities were not Low-High in the ERCA variable, and in terms of the number of laboratories, Surabaya and Sidoarjo were hotspots.
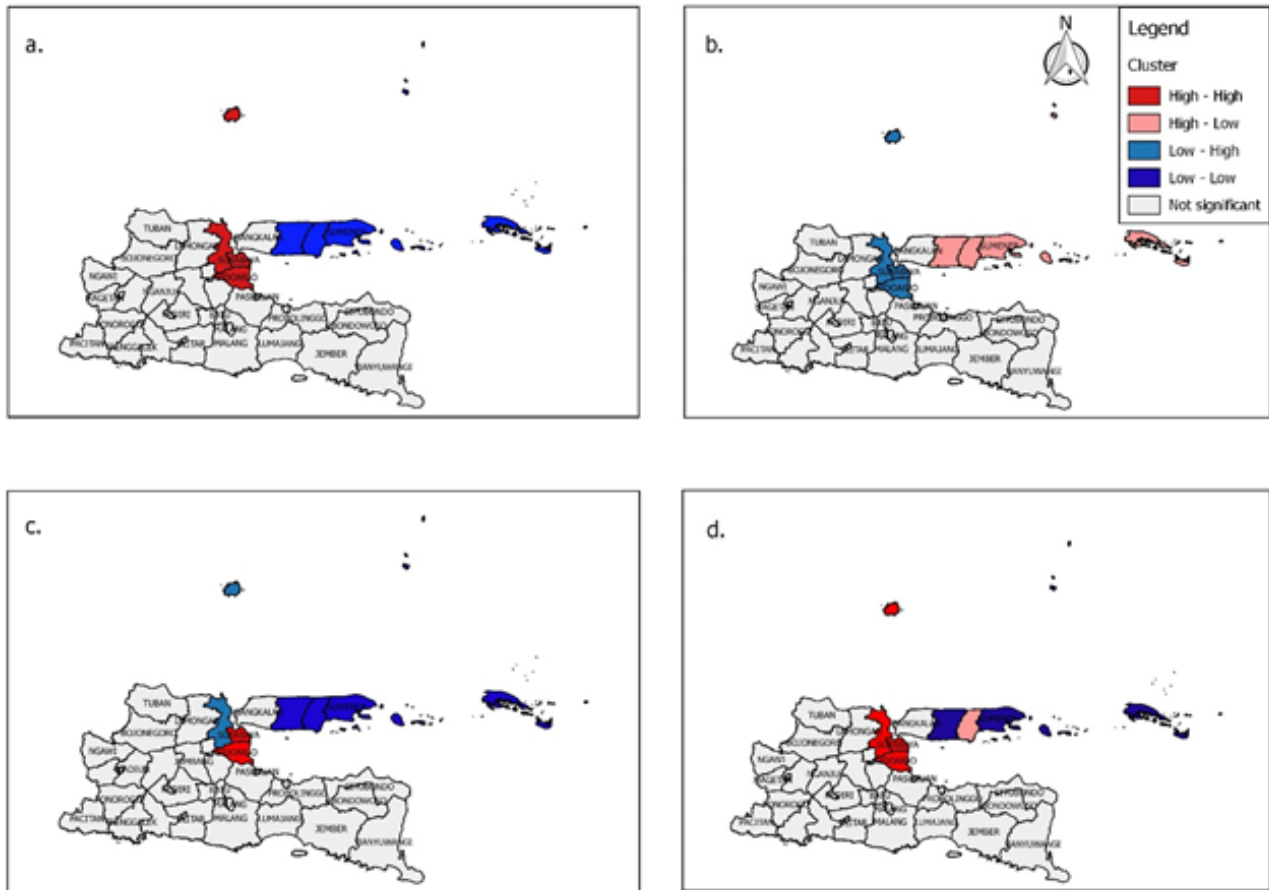
Figure 3. BiLISA Significance Map of COVID-19 Cases and the Risk Factors that have spatial effects in East Java Province: a. Vaccinations coverage; b. The Enforcement of Restrictions on Community Activities' levels; c. Number of laboratories; d. Population density

Discussion

Based on the global value of Moran's I, the distribution of COVID-19 cases showed a significant positive spatial autocorrelation. These results indicate that the pandemic did not occur randomly but had a clustered distribution pattern which indicated the influence of nearby or neighboring regions. These findings were similar to studies conducted in Indonesia. India. South Korea. and Brazil.[7,9-11] The results were in line with the geographical basis of spatial dependence. namely "*everything is related to everything else. But nearby things are more related than distance things*".[15]

This study found 7 municipalities with a higher number of COVID-19 cases (>13 thousand). However, only 3 municipalities, namely Surabaya, Gresik, and Sidoarjo are hotspot locations. They have a significant positive spatial correlation between COVID-19 cases, vaccination coverage, and population density. Sidoarjo and Gresik have become hotspot locations near Surabaya, one of Indonesia's most significant and busiest cities. This can be known from the facilities in Surabaya. such as the international airport. There are many tourist destinations, and it has one of the leading state universities. This makes

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Surabaya a city with high community mobility. The spatial analysis study in DKI Jakarta shows that the hotspots for COVID-19 cases are areas with high business activity.[16]

This study also found that population density had a significant positive spatial correlation with COVID-19 cases shown in Surabaya, Gresik, and Sidoarjo. Those municipalities were in the HH quadrant and had high cases and population density. Previous studies found a positive autocorrelation between population density and COVID-19 cases (Moran's I = 0.13; p = 0.002).[9] Population density impacted the high number of cases.[17,18] Therefore, the ERCA could reduce the spread of Severe Acute Respiratory Syndrome Coronavirus-2 (SARS-CoV-2)[17] and a spatial distancing item was used in another study.[19]

The vaccination coverage also showed a significant positive spatial correlation with the cases. Similar to population density, Surabaya, Gresik, and Sidoarjo were HH locations. The vaccination program has been running since early 2021 and has covered 74.46% of the target population in East Java Province for dose 1,[6] It is expected to reduce the transmission rate of COVID-19. However, the implementation faces various challenges, such as doubts about vaccines, vaccine availability, the equitable allocation for all individuals[20] and difficulties in access for people living in rural areas.[21,22]

In contrast to population density and vaccination coverage. The showed a significant negative spatial correlation with the cases in Gresik and Sidoarjo. Both municipalities were in the LH quadrant. indicating that COVID-19 confirmation cases were low at the low of ERCA's level surrounded by neighbors with high cases and ERCA's level. This finding was in line with the results of a study conducted in DKI Jakarta. where the term Large-Scale Social Restrictions was found to reduce the average number of cases at the beginning of the month although not significantly.[21] Furthermore, study conducted in Spain showed that implementing a lockdown could reduce the number of potential COVID-19 cases by 82.8%.[23] ERCA's level, Large-Scale Social Restrictions and lockdown have different operational definitions, it proved that limiting community interaction could suppress the transmission of the virus.

The availability of a COVID-19 laboratory that can confirm SARS-CoV-2 infection through the Polymerase Chain Reaction (PCR) test is important. A person will be confirmed to be positively infected when the PCR shows positive results.[24] In this study, the number of laboratories showed a significant positive autocorrelation even though the value was weak against the number of cases. There are 96 laboratories in East Java Province, majority of which are in Surabaya, having 32 laboratories.[25]

Conclusion

COVID-19 cases in East Java Province were distributed in clusters and three municipalities had become hotspots that is Surabaya, Gresik and Sidoarjo. In addition, vaccination coverage, The ERCA's levels, and the number of laboratories were also spatially correlated with the cases areas.

Abbreviations

COVID-19 = Coronavirus disease 2019

LISA = Local Spatial Autocorrelation

PCR = Polymerase Chain Reaction

ERCA = Enforcement of Restrictions on Community Activities

Ethics Approval and Consent to Participate

Not needed

Availability of Data and Materials

Sources of data used in this study came from the official website of the government of East Java Province and the Ministry of Health of the Republic of Indonesia which can be accessed by the public (open access).

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References

1. Satgas Penanganan COVID-19. Data Sebaran COVID-19 [Internet]. 2021 [cited 2021 Dec 22]. Available from: https://covid19.go.id/

2. Fisher D, Teo YY, Nabarro D. Assessing national performance in response to COVID-19 [Internet]. Lancet [Internet]. Elsevier; 2020 Sep 5;396(10252):653–5. Available from: https://doi.org/10.1016/S0140-6736(20)31601-9

3. Ritchie H, Mathieu E, Rodés-Guirao L, Appel C, Giattino C, Ortiz-Ospina E, et al. Coronavirus Pandemic (COVID-19) [Internet]. Our World in Data. 2021 . Available from: https://ourworldindata.org/coronavirus

4. Badan Litbangkes, Pusdatin dan PKKR. Laporan mingguan 24-30 Juli 2021. Jakarta 2021 .

5. Burki TK. Lifting of COVID-19 restrictions in the UK and the Delta variant. Lancet Respir Med. 2021 Aug;9(8):e85.

6. Pemprov Jatim. Peta Sebaran COVID-19 Jatim [Internet]. 2021 [cited 2021 Dec 22]. Available from: https://infocovid19.jatimprov.go.id/

7. Eryando T, Sipahutar T, Rahardiantoro S. The Risk Distribution of COVID-19 in Indonesia: A Spatial Analysis [Internet]. Asia Pacific J Public Heal [Internet]. SAGE Publications Inc; 2020 Oct 5;32(8):450–2. Available from: https://doi.org/10.1177/1010539520962940

8. Raymundo CE, Oliveira MC, Eleuterio T de A, André SR, da Silva MG, Queiroz ER da S, et al. Spatial analysis of COVID-19 incidence and the sociodemographic context in Brazil [Internet]. PLoS One [Internet]. Public Library of Science; 2021 Mar 1;16(3):e0247794. Available from: https://doi.org/10.1371/journal.pone.0247794

9. Dutta I, Basu T, Das A. Spatial analysis of COVID-19 incidence and its determinants using spatial modeling: A study on India [Internet]. Environ Challenges [Internet]. 2021;4:100096. Available from: https://www.sciencedirect.com/science/article/pii/S2667010021000755

10. Kim S, Castro MC. Spatiotemporal pattern of COVID-19 and government response in South Korea (as of May 31, 2020) [Internet]. Int J Infect Dis [Internet]. 2020;98:328–33. Available from: https://www.sciencedirect.com/science/article/pii/S1201971220305464

11. Castro RR, Santos RSC, Sousa GJB, Pinheiro YT, Martins RRIM, Pereira MLD, et al. Spatial dynamics of the COVID-19 pandemic in Brazil. Epidemiol Infect. 2021 Feb;149:e60.

12. Ganasegeran K, Jamil MFA, Ch'ng ASH, Looi I, Peariasamy KM. Influence of Population Density for COVID-19 Spread in Malaysia: An Ecological Study. Int J Environ Res Public Health. 2021 Sep;18(18).

13. Fatima M, O'Keefe KJ, Wei W, Arshad S, Gruebner O. Geospatial Analysis of COVID-19: A Scoping Review. International Journal of Environmental Research and Public Health . 2021.

14. BioMedware. BioMedware Space Stata Help [Internet]. BioMedware. 2014 [cited 2021 Dec 23]. Available from: https://www.biomedware.com/files/documentation/spacestat/Statistics/LM/%0AResults/Interpreting_univariate_Local_Moran_statistics.htm

15. Souris M. Epidemiology and Geography Principles, Methods and Tools of Spatial Analysis. Great Britain: ISTE Ltd and John Wiley 7 Sons; 2019.

16. Ginting IR, Makful MR, Muhtar M. Pola Penyebaran COVID-19 di DKI Jakarta pada Bulan Maret-Juli Tahun 2020 Secara Spasial [Internet]. J Kedokt dan Kesehat [Internet]. 2021;17(2):161–9. Available from: https://jurnal.umj.ac.id/index.php/JKK/article/view/8631#:~:text=Hasil analisis spasial pola distribusi,Jakarat Barat dan Jakarta Pusat.

17. Ramírez-Aldana R, Gomez-Verjan JC, Bello-Chavolla OY. Spatial analysis of COVID-19 spread in Iran: Insights into geographical and structural transmission determinants at a province level [Internet]. PLoS Negl Trop Dis [Internet]. Public Library of Science; 2020 Nov 18;14(11):e0008875. Available from: https://doi.org/10.1371/journal.pntd.0008875

18. Wong DWS, Li Y. Spreading of COVID-19: Density matters [Internet]. PLoS One [Internet]. Public Library of Science; 2020 Dec 23;15(12):e0242398. Available from: https://doi.org/10.1371/journal.pone.0242398

19. Abel T, McQueen D. The COVID-19 pandemic calls for spatial distancing and social closeness: not for social distancing! [Internet]. 2020/04/01. Int J Public Health [Internet]. 2020/04/01. Springer International Publishing; 2020 Apr;65(3):231. Available from: https://pubmed.ncbi.nlm.nih.gov/32239256

20. Andersen LM, Harden SR, Sugg MMP, Runkle JDP, Lundquist TE. Analyzing the spatial determinants of local Covid-19 transmission in the United States. Sci Total Environ. 2021 Feb;754:142396.

21. Das RK, Sudaryo MK. Epidemiological Patterns and Spatial Distribution of COVID-19 Cases in DKI Jakarta (March–December 2020) [Internet]. Kesmas J Kesehat

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Masy Nas (National Public Heal Journal); Vol 16, Spec Issue No 1, 2021DO - 1021109/kesmas.v0i05074 [Internet]. 2021 Jul 31; Available from: https://journal.fkm.ui.ac.id/kesmas/article/view/5074

22. Mohammadi A, Mollalo A, Bergquist R, Kiani B. Measuring COVID-19 vaccination coverage: an enhanced age-adjusted two-step floating catchment area model [Internet]. Infect Dis Poverty [Internet]. 2021;10(1):118. Available from: https://doi.org/10.1186/s40249-021-00904-6

23. Orea L, Álvarez IC. How effective has the Spanish lockdown been to battle COVID-19? A spatial analysis of the coronavirus propagation across provinces. Health Econ. 2022 Jan;31(1):154–73.

24. Kementerian Kesehatan. Pedoman Pencegahan dan Pengendalian Coronavirus Disease (COVID-19), Rev-5 ed. Jakarta: Kementerian Kesehatan RI; 2020.

25. Dinkes Jawa Tmur. Profil Kesehatan Provinsi Jawa Timur. 2020 .

A Cross Sectional Study of Personality Profile of Patients with Opioid Related Disorders in a Medical College of Eastern India

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Abstract

Background: In India, one of the most common substances for which people seek treatment is opioids (including opioids taken by the injecting route). This group is often characterized by use of multiple substances. Various biological, social and psychological factors have been implicated in initiation and maintenance of substance use disorders, for example, family history, getting involved with deviant peer group, presence of other psychiatric comorbidities and personality factors.

Methods: 70 people with Opioid related disorders diagnosed by DSM 5 were interviewed with LDQ and NEO FFI3 to asses severity of opioid related disorders and personality of those patients.

Results: The study shows that most of the OUD patients were male. Majority of the OUD patients belonged to urban background. 70 % had initiated use of opioid before 20yrs of age. Patients with low dependence had high neuroticism (32.67±1.15) and extraversion (31.00±2.65). Patients with high dependence had very low conscientiousness (19.5±2.32) and very high neuroticism (38.25±3.55).

Discussion: Neuroticism (38.25±3.55) was very high in high dependency OUD group and so was extraversion (34.92±3.65). Openness to experience, agreeableness and conscientiousness had neutral findings in all the three-dependence category. Hence, there was significant association between the personality profile factors and alcohol dependence and severity of Opioid dependence.

Conflict of Interest : Nil

Key words: Opioid, Personality, Neuroticism, Extroversion, Openness, Agreeableness, and Conscientiousness, Severity

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Introduction

In India, one of the most common substances for which people seek treatment is opioids (including opioids taken by the injecting route). This group is often characterized by use of multiple substances. Various biological, social and psychological factors have been implicated in initiation and maintenance of substance use disorders, for example, family history, getting involved with deviant peer group, presence of other psychiatric comorbidities and personality factors. The conceptualization of personality in substance users shifted from the notion of an "addictive personality" to recognition that certain personality traits specifically impulsivity, sensation-seeking, novelty-seeking, low agreeableness and conscientiousness, high neuroticism are associated with substance use disorders and influence their development, maintenance and course. It has also been reported that personality traits have an effect on treatment-seeking, compliance and outcome of substance use disorders. Although, research has not focused on understanding whether dependent users of different substances differ in their personality traits, studies have found that those with poly- substance use were higher on impulsivity, sensation-seeking and novelty-seeking and lower on socialization as compared to those dependent on a single substance.[1]

The links between these personality dimensions and substance related behaviour appear to be mediated by different reinforcement processes. Therefore, it appears that the negative reinforcement pathway to substance use and misuse implicates two separate motivational processes that may be mediated by two lower-order dimensions of neurotic personality: anxiety sensitivity and hopelessness. There is also increasing evidence that a disinhibitory pathway to substance misuse involves two separate motivational processes, again differentiated based on lower-order aspects of a broad externalizing personality dimension. Sensation seeking, or the desire for intense and novel experiences, has been linked to elevated substance use patterns and self-report motives for substance use that involve enhancement of positive affect. Impulsivity is often differentiated from sensation seeking and venturesomeness, and is often characterized as the inability to control behaviour in the face of cues for reward and/or punishment. While impulsivity is a multidimensional construct, there is emerging evidence that impulsivity (as described above) can be distinguished from other related personality constructs such as reward sensitivity/reactivity, high venturesomeness, and high thrill-seeking. When such a distinction is made, impulsive substance users are differentiated from non-impulsive substance users on laboratory measures of impulsivity (go/no-go and executive cognitive errors) and with respect to severity of substance dependence, presence of antisocial personality, and the presence of other impulse control disorders.[2]

Northeast India is a region with serious drug use problems. Nagaland and Manipur are two sparsely populated states in that region, bordering Burma. These states have the highest prevalence of injecting drug users (IDUs) in India. Unsafe practices, especially needle sharing among IDUs, have been the main drivers of the HIV/AIDS epidemic in the region. More recently, there has been a shift from injecting heroin to injecting pharmaceuticals causing other severe health problems, including abscesses leading to life threatening infections, and eventual amputations.[3]

The most unfortunate aspect of the phenomenon of drug addiction has been the alarming rise of addiction among the youths of this region and consequent increase in the drug related crimes. According to various surveys/ studies conducted in this region, a large percentage of the region's youths are under the spell of drugs. Contrary to the popular belief that it is the college goers who fall easily to drugs these studies suggest that even school going children of this region are falling preys to opioids, tobacco and other addictive substances. However, these studies have suggested that most of the young drug users started taking drugs between the age of 14 to 18 years and the largest member being found to be at the age of 16 and 17 years. These surveys further suggest that about 35 to 40 percent of the teenagers agreed that they tried gateway drugs and tobacco. The pre-matriculation and post-matriculation groups are found to be more susceptible to drugs. Drug addiction is, thus, a major causal factor for alarming rise of delinquent activities among the adolescents of this region.[4]

Therefore, there arose a need for studying the personality profiles of substance users to differentiate them from general population and formulate different treatment plans to curb the menace of drugs and explosion of drug related violence/crimes.

Material and Methods

The participants in this cross-sectional and non-interventional study were those seeking treatment for opioid dependence in the Psychiatry out-patient department of Regional Institute of Medical Sciences (RIMS), Imphal, Manipur during September 2019 to august 2020. They were recruited through the convenience sampling and were assessed only once. The study protocol was approved by the Ethics Review Board of the Institute. Written consent was taken and those fulfilling the diagnosis of opioid use disorder as per DSM 5[5] were further assessed. The Inclusion criteria were patients who were diagnosed as opioid use disorder according to DSM-5 criteria in age range of 18yrs to 65yrs. The Exclusion criteria were any patients having major psychiatric/physical disability such as psychosis or organic brain disorders and were dependent on other substances like alcohol, cannabis, amphetamine type substances (ATS), etc. (except for tobacco). The sample size was taken as 70. Socio-demographic details like age, sex, marital status, educational level, occupation, income, family type, religion, place of residence was recorded using a semi-structured proforma. Detailed history of substance use was collected from the patient/patient party attending the Department of Psychiatry to establish opioid Use Disorder as per DSM-5 criteria. Leeds dependence questionnaire (LDQ)[6] was used to assess the severity of opioid dependence in adult substance users. The instrument is sensitive to mild and moderate levels of dependence and so can be helpful in determining treatment goals.The NEO Five-Factor Inventory-3 (NEO-FFI-3)[7]- a 60-item version of the NEO-PI-3 comprising of 60 items, 12 belonging to each of the following five subscales: Neuroticism, Extroversion, Openness to experience, Agreeableness, and Conscientiousness answered on a five-point Likert scale ranging from strongly disagree (0) to strongly agree (4), was applied to the patients to assess their personality profile.

Statistical analysis

Data was analyzed using SPSS version 23 for Windows. Descriptive statistics like mean, standard deviation, percentage and proportion has been used. Chi-square test/Fisher's exact test, ANOVA test has also been used to test the level of significance. Results on categorical measurements like gender, residence, marital status, employment status, family type, duration of use, frequency of relapse, family history of substance abuse was presented in frequency and percentages. Chi-square test has been used to find the association between study parameters like opioid use disorder and residence, marital status, employment status, duration of substance abuse, family history of substance abuse, while Fisher's Exact test has been used to find the association between study parameters like opioid use disorder and age distribution, gender, socioeconomic status, family type, age of initiation, frequency of relapse etc. ANOVA test has been applied to study the association between study parameters like opioid use disorder with personality profile factors, personality profile factors with severity of substance abuse. P-value of <0.05 is taken as significant.

Results

In this study a total of 70 patients presenting to the Department of Psychiatry, RIMS, Imphal with history of opioid use disorder were taken.

The majority of patients with opioid use disorder were in the age group of 31-40 yrs. Majority of the patients in OUD group were males (98.6% each) with only 1 female in OUD group. Since p value is insignificant there is no relation between gender and opioid use disorder. In the OUD group majority of the patients (78.6%) were from urban residence. Hence there exists a significant relation between residence and opioid use disorder. 54.3% patients in OUD group were married, 42.9% were unmarried and 2.9% were divorced. There exists significant difference in the marital status of patients with opioid use disorder. 59 patients were employed in OUD patients out of 70. There is no significant relationship between employment status and opioid use disorder. In the OUD group 78.6% belonged to middle class, 17.1% belonged to upper middle class and 4.3% belonged

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to lower middle class. There exists significant relationship between the socioeconomic status and opioid use disorder. 98.6% of patients in OUD belonged to nuclear family. There is no significant relationship between family type and opioid use disorder.

Table 1. Sociodemographic Profile Of Patients

Variables		Percentage	P value
Age in years	under 30	40(57.1)	0.000
	31-40	21(30.0)	
	41-50	8(11.4)	
	51 and older	1(1.4)	
Gender	Male	69(98.6)	1.000
	Female	1(1.4)	
Residence	Urban	55(78.6)	0.000
	Rural	15(21.4)	
Marital Status	Married	38(54.3)	0.000
	Unmarried	30(42.9)	
	Divorced	2(2.9)	
Employment Status	Unemployed	11(15.7)	0.056
	Employed	59(84.3)	
Socioeconomic status	Upper middle class	12(17.1)	0.000
	Middle class	55(78.6)	
	Lower middle class	3(4.3)	
Family Type	Nuclear	69(98.6)	0.063
	Joint	1(1.4)	

Table 2. Substance Use Profile of Patients

Variable		Percentage	P value
Age of Initiation in years	<20	49(70.0)	0.000
	21-30	18(25.7)	
	>31	3(4.3)	
Duration of Use (years)	<10	41(58.6)	0.061
	11-20	24(34.3)	
	>21	5(7.1)	
Frequency of Relapse	<4	53(75.7)	0.004
	≥4	17(24.3)	
Family history of substance abuse	Yes	53(75.7)	0.541
	No	17(24.3)	

In OUD group 70 % had initiated use of opioid before 20yrs of age. There is a significant relationship between age of initiation and opioid use disorder. 58.6 % patients in OUD had used the substance for

duration less than 10 yrs. There is no significant relationship between duration of opioid abuse and opioid use disorder. 75.7% of OUD patients had relapsed less than 4 times and 24.3% OF OUD patients had relapsed 4 or more times. There is a significant

Table 3. NEO Five-Factor Inventory-3

variables	Opioid use disorder (Mean ±SD)	P value
Neuroticism	34.21±3.85	0.001
Extraversion	30.99±3.98	0.001
Openness to experience	28.30±3.73	0.319

relationship between frequency of relapse and opioid use disorder. 75.7% of OUD patients had family history of substance abuse. There is no significant relationship between family history of substance abuse and opioid use disorder.

Agreeableness	25.23±3.6	0.001
Conscientiousness	21.61±3.09	0.001

Neuroticism (34.21±3.85) and extraversion (30.99±3.98) were high in patients with OUD. Hence, there exists significant relationship between neuroticism, extraversion with the opioid use disorder.

Table 4. A comparison of study variables in SADQ SEVERITY of AUD patients

variables	Leeds Severity			P value
	Low dependence (Mean ±SD)	Medium dependence (Mean ±SD)	High dependence (Mean ±SD)	
Neuroticism	32.67±1.15	33.42±3.45	38.25±3.55	0.001
Extraversion	31.00±2.65	30.13±3.62	34.92±3.65	0.001
Openness to experience	28.67±4.04	27.82±3.24	30.42±5.14	0.089
Agreeableness	26.33±2.52	24.98±3.54	26.08±4.17	0.551
Conscientiousness	23.33±2.08	21.98±3.11	19.5±2.32	0.023

Table shows that patients with low dependence had high neuroticism (32.67±1.15) and extraversion (31.00±2.65). Patients with high dependence had very low conscientiousness (19.5±2.32) and very high neuroticism (38.25±3.55). Hence, there exists significant relationship between neuroticism, extraversion, agreeableness, conscientiousness with the degree of severity of opioid consumption among the patients of OUD group.

Discussion

The present study conducted at Department of Psychiatry, Regional Institute of Medical Sciences, Imphal included 70 patients aged between 18-65 years who had history of substance abuse using opioids. All the patients were interviewed after receiving consent and those who satisfied the inclusion criteria were taken up for the study. All the patients were assessed for sociodemographic profile, personality profile and severity of substance abuse.

Sociodemographic factors

The maximum number of patients abusing opioids were in the age group of under 30years (57.1%) followed by 30% in age group of 31-40 years. Number of the patients abusing opioids were very less (1.4%) in the group 51years and older. In an Indian study conducted by Gupta SK et al[1] it was found that majority of the patients in the OUD group were in the age group of 20-30 years (50%). This was also supported by other studies done by Kornor H et al[8], McCormick RA et al[9].

Male preponderance was seen in this study in OUD (98.6%) with only 1 female (1.4%). This was also consistent with the finding in the study Kornor H et al[8], McCormick RA et al[9], Nevid JS et al[10] where majority were male patients.

In the OUD group out of 70 patients 15 (21.4%) were belonging to rural background. This was supported by a study done by Gupta SK[1] which found

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that the OUD patients belong to urban background (76.3%).

Around 42.9% were unmarried in OUD group, 54.3% were married and 2.9% divorced. Similar results were shown in study done by Gupta SK[1] with only 50 % married in OUD group. Western studies by Kornor H et al[8], McCormick RA et al[9] showed similar findings.

In OUD group more patients were unskilled (28.6%) and 27.1% were self-employed and 27.1% were skilled workers. This was also found in the study done by Gupta SK et al[1] where in OUD group majority were unskilled (29%). Western studies like Kornor H et al[8], Nevid JS et al[10] also supported this.

Majority of OUD patients (78.6%) were from middle class, followed by 17.1% from upper middle class, 4.3% from lower middle class. In the study done by Gupta SK et al[1] OUD (78%) groups were from middle class background.

Around 98.6% of OUD patients belonged to nuclear family. This was supported by Gupta SK et al[1], Hokm Abadi ME et al[11].

The mean age of opioid abuse initiation was 20.13 years with standard deviation of 4.478. In the OUD group 70% had initiated abuse of opioids before 20 years of age. In study of Gupta SK et al[1], Kornor H et al[8] similar mean age was found.

The study shows OUD patients had 58.6% patients with duration of use less than 10 years. Similarities were found in study conducted by Terraceiano A et al[12].

In the OUD group 75.7% had relapsed less than 4 times. Similar finding of relapses in the OUD group were found in other studies done by McCormick RA et al[9], Kornor H et al[8].

The study shows that the OUD group had positive family history of substance abuse in 75.7% cases. These finding were supported by Kornor H et al[8] who found positive family history in 74% of OUD patients. Similarly other studies supporting were done by McCormick RA et al[9].

Associations with personality profile

The study shows that neuroticism (34.21±3.85)

and extraversion (30.99±3.98) were much high in patients with OUD. In the study conducted by Gupta SK et al[1] OUD group scored significantly higher on anger hostility, depression, self-consciousness, impulsivity (neuroticism) and excitement seeking (extraversion); and scored lower on fantasy, ideas (openness to experience), trust, straightforwardness, altruism (agreeableness) and on all facets of conscientiousness, namely, competence, order, dutifulness, achievement striving, self-discipling and deliberation. Kornor H et al[8], McCormick RA et al[9] had also found similar finding in their studies which had used the NEO-PI-R version.

Neuroticism (38.25±3.55) was very high in high dependency OUD group and so was extraversion (34.92±3.65). Openness to experience, agreeableness and conscientiousness had neutral findings in all the three-dependence category. In the study done by Terracciano A et al[12] using NEO-PI-R scale similar findings were observed. Also, other studies conducted by Kornor H et al[8], Nevid JS et al[10], Hokm Abadi ME et al[11] also reported similar findings.

Limitations

Data was collected from only small sample size and through self-report questionnaires. Therefore, there is a high chance of distortion such as faking, exaggeration or choosing the desirable answer. Period of the study was short and time constraining. Some participants might be reluctant to disclose their illicit drug use, categorizing current user based on self-reported behavior during the past year might be too broad. Moreover, length and severity of addiction as well as comorbid psychiatric disorders were not documented and might have influenced the psychometric findings.

Future directives

A large-scale study would be able to provide a more in depth and detailed understanding of the relationship between big five factor personality traits and substance use disorder. The use of other methods of data collection other than self-report may provide more detailed information that can further strengthen the result of the study. More research is needed to fully evaluate how personality assessment can be useful in the choice of treatment plans.

Conflict of Interest: Nil

Source of funding- Self

Ethical Clearance- Ethical approval was obtained from the Research Ethics Board (REB) in RIMS (Ref no. A/206/REB-Comm (SP)/RIMS/2015/592/70/2019).

References

1. Gupta SK, Ambekar A, Dhawan A, Mehta M. Personality profile of alcohol and injecting opioid users: A comparative study from India. Asian J Psychiatr 2017 Feb 1;25(4):142-6.

2. Woicik PA, Stewart SH, Pihl RO, Conrod PJ. The substance use risk profile scale: A scale measuring traits linked to reinforcement-specific substance use profiles. Addict Behav 2009 Dec 1;34(12):1042-55.

3. Chakrapani V, Newman PA, Shunmugam M, Dubrow R. Social-structural contexts of needle and syringe sharing behaviours of HIV-positive injecting drug users in Manipur, India: a mixed methods investigation. Harm Reduct J 2011 Dec; 8(1):9.

4. Ganapathi L, McFall AM, Srikrishnan AK, Kumar MS, Anand S, Lucas GM, et al. Young people who inject drugs in India have high HIV incidence and behavioural risk: a cross-sectional study. J Int AIDS Soc 2019 May ;22(5):e25287.

5. Hasin DS, O'Brien CP, Auriacombe M, Borges G, Bucholz K, Budney A, et al.DSM-5 criteria for substance use disorders: recommendations and rationale. Am J Psychiatry 2013 Aug;170(8):834-51.

6. Raistrick D, Bradshaw J, Tober G, Weiner J, Allison J, Healey C. Development of the Leeds Dependence Questionnaire (LDQ): a questionnaire to measure alcohol and opiate dependence in the context of a treatment evaluation package. Addiction 1994 May;89(5):563-72.

7. McCrae RR, Costa Jr PT. A contemplated revision of the NEO Five-Factor Inventory. Pers Individ Dif 2004 Feb 1;36(3):587-96.

8. Kornør H, Nordvik H. Five-factor model personality traits in opioid dependence. BMC psychiatry 2007 Dec;7(1):37-40.

9. McCormick RA, Dowd ET, Quirk S, Zegarra JH. The relationship of NEO-PI performance to coping styles, patterns of use, and triggers for use among substance abusers. Addict Behav 1998 Jul 1;23(4):497-507.

10. Nevid JS, Gordon AJ, Barris A, Sperber JE, Haggerty G. Personality profiles of patients with alcohol use disorder and opioid use disorder in an inpatient treatment setting. J Subst Abuse Treat 2019 Feb 1;97:91-6.

11. Hokm Abadi ME, Bakhti M, Nazemi M, Sedighi S, Mirzadeh Toroghi E. The relationship between personality traits and drug type among Substance Abuse. J Health Res 2018 Oct 10;8(6):531-40.

12. Terracciano A, Löckenhoff CE, Crum RM, Bienvenu OJ, Costa PT. Five-Factor Model personality profiles of drug users. BMC psychiatry 2008 Dec 1;8(1):22-37.

Comparison of NABH and AB-PMJAY Quality Standards for Accreditation in a Tertiary Care Medical hospital

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Abstract

Background: Quality Improvement (QI) is the organised approach to design and apply constant development in performance. QI in hospitals increase patient satisfaction, staff satisfaction as well as the quality of care provided by an organisation. In India quality of hospitals is assessed by different standards which primarily included those laid down by National Accreditation Board for Hospitals & Healthcare Providers (NABH), which were introduced in 2006 by Quality Council of India (QCI). In 2018, National Health Authority (NHA), introduced Ayushman Bharat Pradhan Mantri Jan Arogya Yojana (AB – PMJAY) Quality Certification standards, in collaboration with Quality Council of India (QCI), for enhancing patient satisfaction and improving quality standards across the hospitals.

Objectives: The study was carried out with the objective to compare the AB-PMJAY Gold standard with NABH 5th Edition, and to identify challenges faced by hospitals for ensuring compliance to these standards.

Methods: The study design was descriptive cross sectional and was carried in a multi-specialty hospital in Rajasthan in 2022. The study was carried out with the objective to find out similarities and differences in AB-PMJAY and NABH standards. All the 5 chapters (Key Inputs, Clinical Service, Support Services, Patient Care, Health Outcomes) and 53 quality standards of AB-PMJAY were included in the study. Similarly, all the 10 chapters of NABH 5th Edition, including all 100 standards and objective elements were 651 were included in the study. The study was carried out in quality department of a hospital for preparing the hospital team for NABH and AB-PMJAY accreditation.

Results: It is found that AB-PMJAY broadly covers all the quality standards of NABH. Some of the challenges identified in implementation of NABH standards were that it requires more documentation, skilled staff, training need with skilled trainer/coordinator, and the NABH standards are very elaborative and descriptive. The challenges in implementation of AB-PMJAY Gold standards were that to achieve them, hospital have to make improvement in their structural, procedural, and clinical outcomes. The similarities of the standards were that both AB-PMJAY and NABH are constituent board of Quality Council of India (QCI), and both have common target of improving patient's safety and quality of care. The differences include that in more documentation is required

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in NABH in compared to AB-PMJAY, NABH requires skilled staff, it is more descriptive and elaborative, and hospitals require certified NABH co-ordinator for implement NABH standards. NABH comprises of indicators and AB-PMJAY says to do things. There are more financial resources required in implementation of NABH.

Conclusion: The hospital's with NABH's full accreditation can directly apply for AB-PMJAY Gold quality certification.

Key words: Quality Improvement, Patient Safety, National Accreditation Board for Hospitals & Healthcare Providers (NABH), Ayushman Bharat Pradhan Mantri Jan Arogya Yojana (AB – PMJAY)

Introduction

Quality in healthcare has been defined by Institute of Medicine (IoM) as the degree to which health services for individuals and populations increase the likelihood of desired health outcomes[1,2]. The domains of quality include patient experience, safety, effectiveness, efficiency, equity and timeliness[2]. Patient satisfaction is an important measure in assessing quality of healthcare provided by a hospital[3,4].

Quality Improvement (QI) is the organised approach to design and apply constant development in performance. QI includes setting standards, measuring quality and quality improvement[2]. QI in hospitals increase patient satisfaction, staff satisfaction as well as the quality of care provided by an organisation[5,6,7].

Accreditation is process to assess the quality, by external agency, to see whether the entity follows quality standards as laid by accreditation agency[8,9]. Accreditation provides achievable standards that help in improving quality of a organization[10].

In India quality of hospitals is assessed by different standards which primarily included those laid down by National Accreditation Board for Hospitals & Healthcare Providers (NABH), which is a constituent board of Quality Council of India (QCI)[11]. NABH standards were introduced in 2006[12] by QCI and currently fifth edition of the same was introduced in April 2020[13]. NABH standard focus on patient safety and quality of the delivery of services by the hospitals.

NABH standards are divided into 10 chapters viz. Access Assessment and Continuity of Care (AAC), Care of Patients (COP), Management of Medication (MOM)[14], Patient Rights and Education (PRE), Hospital Infection Control (HIC), Patient Safety and Quality Improvement (PSQ) earlier Continuous Quality Improvement (CQI), Responsibilities of Management (ROM), Facility Management and Safety (FMS), Human Resource Management (HRM) and Information Management System (IMS). In these 10 chapters, 5 are patient centered and 5 are healthcare organization management centered. In these chapters there are 100 standards, which are assessed by 651 objective elements[15].

Health has been fundamental human right as per WHO, hence Universal healthcare programs have been launched by Government of India[16]. Universal Health Coverage (UHC) ensures that all people have access to needed health services of sufficient quality without financial hardship[16]. In 2018, Ayushman Bharat Pradhan Mantri Jan Arogya Yojana (AB – PMJAY) was introduced which provides health insurance coverage to economically weaker population of India. It provides health insurance to 10 crore households or 50 crore Indians an insurance coverage of Rs. 5 lac per family per year for medical treatment in private and public empanelled hospitals. AB-PMJAY is implemented by National Health Authority (NHA), which is autonomous organization under the control of the Ministry of Health and Family Welfare.

NHA introduced AB PMJAY Quality Certification standards, in collaboration with Quality Council of India (QCI), for enhancing patient satisfaction and improving quality standards across the hospitals. These standards are divided into three levels- Bronze, Silver, and Gold. The highest standard is Gold standard and to achieve this, healthcare organization need to improve the nature of care. AB-PMJAY standards are divided into 5 chapters- Key Inputs, Clinical Services, Support Services, Patient Care and Health Outcomes[17].

With this backdrop, the current study was carried out with the **objective** of comparing AB-PMJAY Gold standard with NABH 5th Edition, and to identify challenges faced by hospitals for ensuring compliance to these standards.

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Materials and Methods

The study design was descriptive cross sectional and was carried in a multi-specialty hospital in Rajasthan in 2022. The study was carried out with the objective to find out similarities and differences in AB-PMJAY and NABH standards. All the 5 chapters (Key Inputs, Clinical Service, Support Services, Patient Care, Health Outcomes) and 53 quality standards of AB-PMJAY were included in the study. Similarly, all the 10 chapters of NABH 5th Edition, including all 100 standards and objective elements were 651 were included in the study. The study was carried out in quality department of a hospital for preparing the hospital team for NABH and AB-PMJAY accreditation.

Results and Discussion

The comparative analysis of each chapter of AB-PMJAY with NABH has been mentioned below in Figure 1-5.

COMPARATIVE ANALYSIS OF NABH AND AB-PMJAY

Comparative Analysis of Chapter 1, Key inputs of AB-PMJAY with NABH

Chapter-1 of AB-PMJAY quality certification deals with **Key Inputs (KI)**, there are 10 standards, naming KI 1 till KI 10. They were compared to NABH 5th Edition standard. This has been shown in Figure 1.

Chapter 1 - Key inputs (KI) of AB-PMJAY	NABH 5th Edition standard
KI 1	FMS 1, FMS 2
KI 2	COP 3 A
KI 3	FMS 1 B
KI 4	PSQ 2
KI 5	FMS 2
KI 6	HRM 9, HRM 10
KI 7	FMS 4A
KI 8	FMS 7
KI 9	COP 5
KI 10	HRM 3, HRM 4

Figure 1 Comparison of Chapter 1 - Key inputs of AB-PMJAY with NABH

KI 1 standard states that the Physical facility of the building and hospital environment shall be developed and maintained for safety of patient, visitors, and staff, could be compared with FMS 1, FMS 2 of NABH. FMS 1 states that the Organisation has a framework set up to give a sheltered and secure condition, and FMS 2 states that the organization's environment and facilities operate in a planned manner to ensure safety of patients, their families, staff and visitors and promote environment friendly measures. KI 2 states that there should be proper space for ambulance and movement of patient. It could be compared to COP 3 A of NABH standard which states there should be adequate access and space for the ambulance(s). KI 3 states that there should be no physical barriers for patients and the environment should be friendly for patients with disabilities. It could be compared to FMS 1 B of NABH which states that patient-safety devices & infrastructure are installed across the organisation and inspected periodically. KI 4 states that the indoor and outdoor areas of the facilities should be well-lit. It could be compared to PSQ 2 of NABH which states that the organization implements a structured quality improvement and continuous monitoring programme.

KI 5 states that basic amenities should be provided for all patients, hospital staff and visitor. It could be compared to FMS 2 of NABH which states that the organisation's environment and facilities operate in a planned manner to ensure safety of patients, their families, staff and visitors and promote environment friendly measures. KI 6 states that the hospital should ought to guarantee that all clinical staff is sufficiently accredited according to the legal standards. It could be compared to HRM 9, HRM 10 of NABH standard. HRM 9 states that process for Medical Professional permitted to provide patient care without supervision and HRM 10 states that there should be process for credentialing and privileging Nursing Professionals, permitted to provide patient care without supervision. KI 7 states that the facility has functional equipment & instruments as per the requirement of organization, whereas FMS 4A of NABH states that the organization should plan for utility and engineering equipment in accordance with its services and strategic plan. KI 8 states that fire detection and firefighting equipment should be installed as per fire safety norms along

with staff training, whereas FMS 7 of NABH states that the organization has plans for fire and non-fire emergencies within the facilities. KI 9 states that staff involved in direct patient care shall be trained in Cardio Pulmonary Resuscitation (CPR)and Basic Life Support (BLS) along with the display of the same in all critical areas whereas COP 5 of NABH states that documented strategies and systems should manage the consideration of patients requiring cardio-pulmonary resuscitation. KI 10 states that yearly preparing arrangement ought to be set up for all staff covering all preparation needs, could be compared to HRM 3 and HRM 4 of NABH. HRM 3 states that there is an on-going programme for professional training and development of the staff, whereas HRM 4 states that staff are adequately trained on various safety-related aspects.

Comparative Analysis of Chapter 2, Clinical Services (CS) of AB-PMJAY with NABH

Chapter-2 of AB-PMJAY quality certification deals with **Clinical Services**, there are 11 standards, naming CS 1 till CS 11. They were compared to NABH standard which are mentioned in Figure 2.

Chapter 2 - Clinical Services (CS) of AB-PMJAY	NABH 5th Edition standard
CS 1	PRE 1
CS 2	AAC 6, AAC7, AAC8
CS 3	COP 8
CS 4	AAC 9, AAC 10, AAC 11
CS 5	COP 9
CS 6	COP 14
CS 7	MOM 3
CS 8	MOM 6, MOM 8
CS 9	HIC, HIC 2
CS 10, 11	COP 13

Figure 2: Comparative Analysis of Chapter 2, Clinical Services of AB-PMJAY with NABH.

CS 1 states that patients privacy should be maintained in Out Patient Department (OPD) and In-Patient Department (IPD). It could be compared to PRE 1 of NABH which states that the organisation protects and promotes patient and family rights and informs them about their responsibilities during care. CS 2 states that the Lab diagnostic services, whether in house or outsourced, should be as per the scope of services. It could be compared to AAC 6, AAC7 and AAC8 of NABH. AAC 6 states that Laboratory services are provided as per the scope of services of the organisation, AAC 7 states that there is an established laboratory quality assurance programme and AAC 8 states there is an established laboratory safety programme. CS 3 states that blood bank services if available shall be as per the statutory/ regulatory norms. It could be compared to COP 8 of NABH which states that transfusion of blood and blood components is done safely, and documented policies and procedures define rational use of blood and blood components. CS 4 states that the hospital should adhere to the Radiation safety precautions as per the regulatory norms. It could be compared to AAC 9, AAC 10 and AAC 11 of NABH. AAC 9 states that imaging services are provided as per the scope of services of the organisation, AAC 10 states that there is an established quality assurance programme for imaging services, and AAC 11 states that there should be an established safety program in Imaging services. CS 5 states that Intensive Care Unit (ICU) services should be available as per the scope of services along with the required Infrastructure and Manpower, whereas COP 9 of NABH states that the organisation provides care in intensive care and high dependency units in a systematic manner. CS 6 states that OT complex should be available as per the regulatory requirements, which could be compared to COP 14 of NABH which states that surgical services are provided in a consistent and safe manner. CS 7 and CS7 could be compared with MOM 3, MOM 6 and MOM 8 of NABH. CS 7 states that medicines that looks alike and sounds alike should be identified and kept separately to avoid any dispensing and administration errors. CS 8 states that policies and procedures for identification, self-dispensing and administration of all high-risk medicine should be documented and implemented. MOM3 of NABH states that documented policies and procedures guide the storage of medication, MOM 6 states that medications are dispensed in a safe manner, and MOM 8 states that patients are monitored after medication administration. CS 9 states that the facility has defined and established antibiotic

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policy, which could be compared to HIC and HIC 2 of NABH. HIC states that the organization has an effective antimicrobial management programme through regularly updated antibiotic policy, and HIC 2 states that the organisation provides adequate and appropriate resources for infection prevention and control. CS 10 and CS 11 could be compared to COP 13 of NABH standard. CS 10 states that Pre-operative, Intra-operative and post-operative assessment should be done and documented by appropriately qualified staff in standardized format, and CS 11 states that Pre-Anaesthesia assessment, type of anaesthesia and post anaesthesia status should be documented. COP 13 of NABH states that anaesthesia services are provided in a consistent and safe manner.

Comparison of Chapter 3, Support Services (SS) of AB-PMJAY with NABH

Chapter-3 of AB-PMJAY quality certification deals with **Support Services**, there are 10 standards, naming SS 1 till SS 10. They were compared to NABH standard which are mentioned in Figure 3.

Chapter 3 – Support Services (SS) of AB-PMJAY	NABH 5th Edition standard
SS 1	HIC
SS 2	FMS 4
SS 3	FMS 2 d
SS 4	FMS 2 e
SS 5	FMS 6
SS 6	ROM 3 c
SS 7	HIC 1,HIC 1a,HIC 2, HIC 2d
SS 8	HIC 4d
SS 9	HIC 4e, 4c, 4f, HIC 7, COP 2, COP 3
SS 10	HRM 8

Figure 3- Comparison of Chapter 3, Support Services of AB-PMJAY with NABH.

The first standard SS 1, in chapter three, support services, states that Hospital should be clean and have well managed flooring, which could be compared with HIC of NABH which deals with infection prevention and control and biomedical waste management. SS 2 states that temperature control and ventilation should be maintained in patient care and nursing area, which

could be compared to FMS 4 of NABH which states that the organisation has a programme for the facility, engineering support services and utility system. SS 3, SS 4 could be compared with FMS 2 d and FMS 2 e. SS 3 states that the hospital should have an arrangement of water storage and should be tested periodically as per requirement. SS 4 states that the hospital should have 24 hours supply of electricity, either through direct supply or from other sources. FMS 2 d of NABH states that potable water and electricity are available round the clock, and FMS 2 e of NABH states that alternate sources for electricity and water are provided as backup for any failure / shortage. SS 5 states that medical gases and vacuum shall be made available all the time and sorted safely. Compressed air should be made available as per requirement. It could be compared to FMS 6 of NABH which states that the organisation has a programme for medical gases, vacuum and compressed air. SS 6 states that the facility should adhere to the practices specified under statutory compliances as per the scope of services - Licenses with Certificate number, date of issue and date of expiry, which could be compared with ROM 3 c of NABH which states that the leader is responsible for and complies with the laid-down and applicable legislations, regulations and notifications. SS 7 could be compared with HIC 1,HIC 1a, HIC 2, HIC 2d of NABH. SS 7 states that the hospital should ensure that appropriate Infection control practices are being followed along with hand hygiene practices. HIC 1 of NABH states that the organisation has a well-designed, comprehensive and coordinated Hospital Infection Prevention and Control (HIC) programme aimed at reducing/eliminating risks to patients, visitors and providers of care. HIC1a states that the hospital infection prevention and control programme is documented, which aims at preventing and reducing the risk of healthcare associated infections in the hospital. HIC 2 states that the organisation provides adequate and appropriate resources for infection prevention and control. HIC 2d states that adequate and appropriate facilities for hand hygiene in all patient-care areas are accessible to healthcare providers. SS 8 could be compared to HIC 4d of NABH. SS 8 states that hospital should ensure Bio-medical waste management practices as per the statutory norms (BMW amendment rules 2018). HIC 4d states that Biomedical waste (BMW)

is handled appropriately and safely. SS 9 could be compared with HIC 4e, HIC 4c, HIC 4f and HIC 7, COP 2 and COP 3 of NABH. SS 9 states that Hospital should ensure that services i.e. (Laundry, Housekeeping, Dietary, security, Ambulance, Mortuary, Central Sterile Supply Department (CSSD) etc. are available (in-house or outsourced). HIC.4e states that the organisation adheres to laundry and linen management processes, HIC.4c states that the organisation adheres to housekeeping procedures, HIC.4f states that the organisation adheres to kitchen sanitation and food-handling issues, COP 2 states that emergency services are provided in accordance with written guidance, applicable laws and regulations, COP 3 states that ambulance services ensure safe patient transportation with appropriate care, and HIC 7 which states that infection prevention measures include sterilisation and/or disinfection of instruments, equipment and devices. SS 10 states that sexual abuse and grievance handling procedure should be available, whereas HRM 8 of NABH states that process for disciplinary and grievance handling is defined and implemented in the organisation.

Comparison of Chapter 4, Patient Care (PC) of AB-PMJAY with NABH

Chapter-4 of AB-PMJAY quality certification deals with patient care services, there are 11 standards, naming PC 1 till PC 11. They were compared to NABH standard which are mentioned in Figure 4.

| Chapter 4 – Patient Care (PC) of AB-PMJAY	NABH 5th Edition standard
PC 1	AAC 1
PC 2	AAC 1d
PC 3	AAC.1. b
PC 4, PC 5	AAC.2
PC 6	AAC 3
PC 7	PRE 4
PC 8	PRE 6
PC 9	PRE 3
PC 10	MOM 4
PC 11	IMS 3, IMS 4

Figure 4 Comparative Analysis of Chapter 4, Patient Care of AB-PMJAY with NABH

The first standard SS 1, in chapter four, patient care, states that hospital should have uniform and user-friendly signage system in English and in the local language understood by Patient / family and community. This could be compared with AAC 1 of NABH which states that the organization defines and displays the healthcare services that it provides. PC 2 states that all signage's those are required by law should be displayed at all strategic locations, whereas AAC 1d states that the organization defined healthcare services are prominently displayed. PC 3 states that contact information of key medical staff and specialist should be readily available in the emergency department, which could be compared to AAC.1. b which states that each defined healthcare service should have diagnostic and treatment services with suitably qualified personnel who provide out-patient, in-patient and emergency cover. PC 4 states that service counters for the enquiry are available as per the patient load and are duly managed by hospital staff for the registration of patients, PC 5 states that hospitals should have established procedure for admission on patients which could be compared to AAC 2 of NABH which states that the organisation has a well-defined registration and admission process. PC 6 states that referral of patients to another facility along with the documented medical information, in case of non-availability of services and/or beds which could be compared to AAC 3 which states that there should be an appropriate mechanism for transfer (in and out) or referral of patients. PC 7 states that general consent and Informed consent should be taken during the admission and before any procedure/surgery and Anaesthesia/Sedation, whereas PRE 4 of NABH states that informed consent is obtained from the patient or family about their care. PC 8 states that user charges are displayed and communicated to patients effectively at the time of registration, admission to the ward and in case of a change in medical and surgical plan, which could be compared to PRE 6 of NABH which states that patients and families have a right to information on expected costs. PC 9 states that patient should be properly educated on additional care as deem required and all the vital information should be recorded for continuity of care, whereas PRE 3 of NABH states that the patient and/or family members are educated to make informed decisions and are involved in the care planning and delivery

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process. PC 10 states that hospitals should ensure that all medications and associated instruction are written in prescription whereas MOM 4 of NABH states that medications are prescribed safely and rationally. PC 11 states that medical record should be retained as per the policies of hospitals based on national and local law, which could be compared to IMS 3 and IMS 4 of NABH. IMS 3 states that the patients cared for by the organisation have a complete and accurate medical record. IMS 4 states that the medical record reflects continuity of care.

Comparison of Chapter 5, Health Outcomes (HO) of AB-PMJAY with NABH

Chapter-5 of AB-PMJAY quality certification deals with **Health Outcomes**, there are 11 standards, naming HO 1 till HO 11. They were compared to NABH standard which are mentioned in Figure 5.
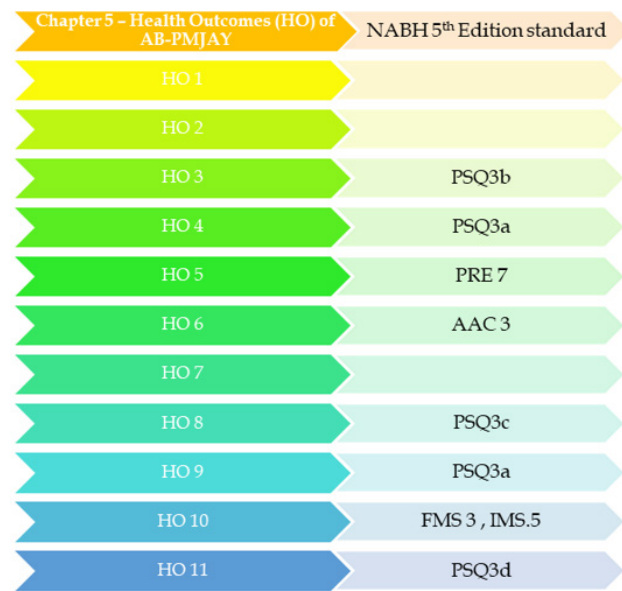
Figure 5 Comparative Analysis of Chapter 5, Health Outcomes of AB-PMJAY with NABH

HO 1 refers to recording Monthly Out Patient Department (OPD) and In-Patient Department (IPD) census, HO 2 refers to Mortality Rate and Average length of stay, HO 3 refers to measuring Infection Rates - Surgical Site, Urinary Tract, Bloodstream, Ventilator Associated Pneumonia (VAP)/ Hospital Acquired Infection (HAI) which could be compared with PSQ3b of NABH which states that the organisation identifies and monitors the key indicators to oversee infection control activities. Also

in NABH Key Performance Indicators, in annexure, include measuring Catheter associated Urinary tract infection rate, Ventilator associated Pneumonia rate, Central line – associated Blood stream infection rate, Surgical site infection rate. HO 4 refers to measuring transfusion reaction (if applicable) whereas PSQ3a of NABH refers to measuring percentage of transfusion reactions. HO 5 refers to bed occupancy, HO 6 refers to percentage of patient satisfaction, which can be compared with PRE 7 of NABH which states that the organisation has a mechanism to capture patient's feedback and to redress complaints, PRE 7 b states that the organisation has a mechanism to capture feedback from patients, which includes patient satisfaction. In NABH Key Performance Indicators in annexure, PSQ3c refers to measuring waiting time for out- patient consultation, PSQ4c which refers to waiting time for diagnostics. HO 7 refers to percentage of employee satisfaction, HO 8 refers to holding up time-OPD and release, HO 9 refers to reporting of adverse events, whereas in NABH Key Performance Indicators in annexure, PSQ3a refers to percentage of surgeries where the organisation's procedure to prevent adverse events like wrong site, wrong patient and wrong surgery. HO 1O refers to reporting of Thefts / Security related incidents, whereas FMS 3 of NABH states that the organisation's environment and facilities operate to ensure the safety of patients, their families, staff and visitors, and IMS 5 states that the organisation maintains confidentiality, integrity and security of records, data and information. HO 11 refers to reporting of Needle stick injuries, whereas ABH Key Performance Indicators in annexure, PSQ3d refers to Incidence of needle stick injuries /1000 in-patient days to be collected monthly.

Challenges, similarities, and differences between AB-PMJAY and NABH

The similarities of the standards were that both AB-PMJAY and NABH are constituent board of Quality Council of India (QCI), and both have common target of improving patient's safety and quality of care.

The differences include that in more documentation is required in NABH in compared to AB-PMJAY, NABH requires skilled staff, it is more descriptive and elaborative, and hospitals require

certified NABH co-ordinator for implement NABH standards.

The challenges identified in implementation of NABH standards were that it requires more documentation, skilled staff, training need with skilled trainer/coordinator, and the NABH standards are very elaborative and descriptive. The challenges in implementation of AB-PMJAY Gold standards were that to achieve them, hospital have to make improvement in their structural, procedural, and clinical outcomes.

Conclusion

It is concluded that AB-PMJAY broadly covers all the quality standards of NABH. From the comparative analysis of both AB-PMJAY and NABH it is also concluded that the scope of NABH is very wide and descriptive. NABH comprises of indicators and AB-PMJAY says to do things. There are more financial resources required in NABH and the quality budged need to be maintained and regularly updated. Many standards of AB-PMJAY standards are also covered in NABH. The hospital's with NABH's full accreditation can directly apply for AB-PMJAY Gold quality certification.

Ethical clearance- Due considerations of confidentiality and privacy of information has been undertaken in this study.

Source of funding- Self.

Conflict of Interest - Nil

References

1. Lohr KN, Schroeder SA. A Strategy for Quality Assurance in Medicare. http://dx.doi.org/101056/NEJM199003083221031 [Internet]. 2010 Jan 14;322(10):707–12. Available from: https://www.nejm.org/doi/full/10.1056/nejm199003083221031

2. Atkinson S, Ingham J, Cheshire M, Went S. Defining quality and quality improvement. Clin Med (Northfield Il) [Internet]. 2010 Dec 1;10(6):537–9. Available from: https://www.rcpjournals.org/content/clinmedicine/10/6/537

3. Afolabi OF, Ugwu CN, Eze CO, Serges-Anthanase DF, Onwuchekwa CO, Ude MA. Quality of Health Care in Resource Limited Settings-Patients' Satisfaction Survey at a Mission Hospital in South East, Nigeria.

Open J Intern Med. 2021;11(04):201–9.

4. Jain S, Pareek R. A study to access level of satisfaction amongst the patients visiting outpatient department in a multispeciality hospital, International Journal of Research in Commerce and Management, Vol-11 (2020), Issue-05, pg. 11-19. Available from: https://ijrcm.org.in/article_info.php?article_id=9283

5. Varkey P, Reller MK, Resar RK. Basics of Quality Improvement in Health Care. Mayo Clin Proc. 2007 Jun 1;82(6):735–9.

6. Weiner BJ, Alexander JA, Shortell SM, Baker LC, Becker M, Geppert JJ. Quality improvement implementation and hospital performance on quality indicators. Health Serv Res [Internet]. 2006 Apr;41(2):307–34. Available from: https://pubmed.ncbi.nlm.nih.gov/16584451/

7. Joseph S. Does Accreditation Symbolise Quality in Public Healthcare Delivery? An Investigation of Hospitals in Kerala: https://doi.org/101177/09720634211050482 [Internet]. 2021 Oct 20;23(4):715–29. Available from: https://journals.sagepub.com/doi/abs/10.1177/09720634211050482

8. Alkhenizan A, Shaw C. Impact of Accreditation on the Quality of Healthcare Services: a Systematic Review of the Literature. Ann Saudi Med [Internet]. 2011 Jul [cited 2022 Jul 20];31(4):407. Available from: https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3156520/

9. Klazinga N. Re-engineering trust: the adoption and adaption of four models for external quality assurance of health care services in western European health care systems. Int J Qual Heal care J Int Soc Qual Heal Care [Internet]. 2000 Jun [cited 2022 Jul 20];12(3):183–9. Available from: https://pubmed.ncbi.nlm.nih.gov/10894189/

10. Montagu, D. (2003) Accreditation and Other External Quality Assessment Systems for Health Care. DFID Health Systems Resource Centre, Working Paper. - References - Scientific Research Publishing [Internet]. [cited 2022 Jul 20]. Available from: https://www.scirp.org/(S(351jmbntvnsjt1aadkposzje))/reference/ReferencesPapers.aspx?ReferenceID=1309904

11. Jain S, Bawa J. Gap Analysis in Internal Assessment against National Accreditation Board for Hospitals & Healthcare Providers (NABH) Standards in 200+ Bedded Super Specialty Hospital. Int J Adv Res Innov Ideas Educ. 2017;3(5):18–31. Available from: https://ijariie.com/FormDetails.aspx?MenuScriptId=35397

12. David SNJ, Valas S. National Accreditation Board for Hospitals and Healthcare Providers (NABH) Standards: A review. Curr Med Issues [Internet].

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Quality Standards for Accreditation in a Tertiary Care Medical hospital

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2017;15(3):231. Available from: https://www.cmijournal.org/article.asp?issn=0973-4651;year=2017;volume=15;issue=3;spage=231;epage=236;aulast=David

13. Battu G. NABH 5th Edition standards - Applicability to anaesthesia practices. Indian J Anaesth [Internet]. 2020 Aug 1;64(15):S214–6. Available from: https://journals.lww.com/ijaweb/Fulltext/2020/64003/NABH_5th_Edition_standards___Applicability_to.16.aspx

14. Gadre S, Bhowmick S, Paul P, Roy T, Maiti D, Sarkar A, et al. A Key Aspects of Management of Medication (MOM) in Hospitals : Insights from NABH 5th Edition Hospital standards. J Curr Med Res Opin [Internet]. 2022 Feb 12;5(02):1136–44. Available from: https://www.cmro.in/index.php/jcmro/article/view/483

15. Hiremani SG, Hosamani DS, Patil RM, More MB, Shivananda, Gundalli M, et al. To study the requirements of quality standards of NABH/ NABL. IP Int J Med Paediatr Oncol [Internet]. 2020 Apr 15;6(1):14–22. Available from: https://www.ijmpo.com/article-details/11060

16. Chellaiyan VG, Rajasekar H, Taneja N. Health Coverage Across the Globe:A Contemporary Scenario. Indian J Public Heal Res Dev [Internet]. 2020 Feb 1;11(2):70–4. Available from: https://www.i-scholar.in/index.php/ijphrd/article/view/194755

17. Angell BJ, Prinja S, Gupt A, Jha V, Jan S. The Ayushman Bharat Pradhan Mantri Jan Arogya Yojana and the path to universal health coverage in India: Overcoming the challenges of stewardship and governance. PLoS Med [Internet]. 2019 Mar 1;16(3). Available from: https://www.ncbi.nlm.nih.gov/pmc/articles/PMC6405049/

A Comparative Study to Find the Effect of Aerobic Exercise Training Versus Resistance Exercise Training in Adults with Pre-Hypertension

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Abstract

Background and Objectives: In 2003, the Seventh Report of the Joint National Committee (JNC 7) defined prehypertension as a systolic blood pressure (BP) of 120–139 mmHg or a diastolic BP of 80–89 mmHg in adults 18 years and older. Prehypertension seems indeed to be a precursor of hypertension, associated with many adverse outcomes. The conversion rate of prehypertension to hypertension over 4 years was 30%. Many studies have focused also on the predictors of progression from prehypertension to hypertension. However, the results were controversial, and Therefore, we performed this study in order to find out and compare the effect of aerobic and resistance exercise training in adults with prehypertension.

Method: This study was done on 40 subjects who were randomly divided into two groups, Group A (N=20) with mean age 49.45 (SD±5.586) and Group B (N=20) with mean age 45.25 (SD±4.375) where Group A was given aerobic exercise and Group B was given resistance exercise. The outcome measure was taken as BP. Exercise session for both group was for 5 days (40minute/day) per week for 4 weeks.

Result: Statistical analysis was done using SPSS version. The paired 't' test was used to find the effect of aerobic and resistance exercise in prehypertension. Result showed significant reduction in blood pressure in both group. in aerobic group the pre and post effect of aerobic exercise is mean=2.30,SD=1.658 since the significance value for changes in all measurement are less then 0.05(p=0.00) and the average difference in 3.25 per subject in aerobic group and in resistance group the pre and post effect of resistance exercise is mean=2.50,SD=1.638 since the significance value for changes in all measurement are less then 0.05(p=0.00) and the average difference of 2.95 per subject in resistance group. These result showed significant reduction in BP (p<0.05) in both aerobic and resistance group.

Conclusion: The study concluded that the aerobic exercise and resistance exercise both were effective in prehypertension. And these results also suggest that there are no significant comparative difference between aerobic and resistance group.

Key Words: Blood pressure, Prehypertension, Aerobic exercise, Resistance exercise.

Introduction

Blood pressure (BP) is the pressure exerted by circulating blood upon the walls of blood vessels.[1] "Prehypertension" is defined as systolic BP 120 to 139 or diastolic BP 80 to 89 mm Hg, based on "2 or more properly measured seated BP

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readings on each of 2 or more visits.[1] Hypertension, sometimes called arterial hypertension, is a chronic medical condition in which the blood pressure in the arteries is elevated. It is summarised by two measurements systolic and diastolic.[2]

Hypertension is classified as either primary (essential) hypertension or secondary hypertension. About 90–95% of cases are categorized as primary hypertension, defined as high blood pressure with no obvious underlying cause. The remaining 5–10% of cases are categorized as secondary hypertension, defined as hypertension due to an identifiable cause, such as chronic kidney disease, narrowing of the aorta or kidney arteries, or an endocrine disorder such as excess aldosterone, cortisol, or catecholamines.[3]

Life style modification can help reduce symptoms in prehypertension and hypertension patients. Lifestyle modification includes increasing physical activity, and reducing sodium intake to<6g of sodium chloride daily, low alcohol intake,. Patients who were randomly assigned to a low salt diet/ sodium<1800mg/24hour had a 25% risk reduction in cardiovascular disease.[13]

Based on the high number of exercise related benefit, It is recommended that the exercise as a part of initial treatment strategy for individual with high blood pressure.[14] Regular physical exercise has been recommended for prevention and treatment of hypertension. Physical exercise can be divided into 2 broad categories namely aerobic exercise training and resistance exercise training.[15]

Intervention studies have shown that regular aerobic activity can reduce systolic and diastolic blood pressure by approximately 10 mmHg. Four weeks of chronic aerobic exercise can lower resting BP by 10/6 mm Hg, and the reduction can persist for a period of 7 days.[16] Chronic exercise training significant reduction in resting BP (SBP = 7.0 To 1.4 mm Hg/DBP = 5.2 To1.2 mm Hg), typical of values reported for this age group (45–60 yr old).[17] Also, resistance exercise tends to produce greater decreases in blood pressure.[18]

Need Of Study:

Hypertension is a common risk factor and the prevalence of hypertension rises sharply with age.

Prehypertension is more common in adults due to sedentary life style, high sodium diet intake, low physical activity ,and cigarette smoking. Prehypertensive are at a higher risk of developing hypertension.[19]

So, our study is to find and compare the effectiveness of aerobic exercise versus resistance exercise in prehypertension.

OBJECTIVES

- To find the effectiveness of aerobic exercise training in pre hypertension.
- To find the effectiveness of resistance exercise training in prehypertension.
- To compare the effect of aerobic exercise training versus resistance exercise training in prehypertension.

Research Methodology

Study Design: Experimental design comparative in nature

Source Of Data Collection: Choithram Hospital and Research Center Indore M.P.

Method Of Data Collection: Random sampling

Sample Size: Total 40 Subjects

Study Duration: 4 weeks

Inclusion Criteria:

- Age group: 35-55 years.
- Males and females
- Clinically diagnosed with essential or primary prehypertension with in 6 months
- Person with BMI 18.5-24.9 and 25-30

Exclusion Criteria:

- Antenatal females
- Post natal females(till 1 year)
- Any other cardiac risk factor or any post cardiac surgery patient
- Orthopedic and neurological conditions(recent fracture or stroke)
- Subject not willing for follow up
- Subjects taking antihypertensive medication

Material Used For Study With Their Reliability And Validity:

- Thera band (Active band)
- Treadmill(Marathon)
- Dumbbell
- Stepper
- Sphygmomanometer(diamond)
- Stethoscope(diamond)
- Couch
- chair

Procedure and Method

Method

- 40 subjects clinically diagnosed as prehypertension were selected according to inclusion and exclusion criteria and they were divided into two groups; namely group A (Aerobic exercise group)and group B(Resistance exercise group), consisting of 20 subject in each. Both the group were informed and the purpose of the study was explained.

- A brief explanation about the treatment session was explained to both.

- Blood pressure reading were taken on first day(morning)and started exercise program for both group A and B & BP was taken regularly on daily basis before the start of exercise.

PROCEDURE

- **Exercise Prescription:**

- **Group – A: Aerobic Exercise- Duration-40 Minute/Day Intensity-5 Days/Week**

1. Aerobic exercise group was given warm up exercises for 5 minutes which includes stretching of biceps, triceps, pectorals, lateral flexors of trunk, quadriceps, hamstring and calf muscle. Stretching session included 30seconds (three sets of 10 second) of stretch for each muscle with 15 second relaxation after each muscle stretch was given.

2. Brisk walking on treadmill-for 15 minute was included warm up period for 5 minute(speed-3.5mph,steady walk) then 9minute brisk walk(4.5mph) and cool down period included 1 minute walk(3.5pmh).

3. Jumping for 2 minute(6 sets of 10 repetation,20 second for 1 repetation with 5 second rest period)

4. Stepper for 2 minute(6 sets 10 repetation with 5second rest period)

5. Static cycling for 2 minute(3 sets of 20 repetation with 10 second rest period)

6. Burpee for 2 minute(6 sets of 10 repetation with 5 second rest period)

7. Cool down for 5minute which included stretching of biceps, triceps, pectorals, lateral flexor of trunk, quadriceps, hamstring and calf muscle and rest period for 15 second after each muscle stretch include deep breathing exercise.

   All the above exercise was done regularly by the subjects for 4 weeks (5 days per week) and pre and post BP reading were statistically compared to find the effect of aerobic exercise.

Group - B: Resistance Exercise- Duration-40 Minute/Day Intensity-5days/Week

1. Resistance exercise group was given warm up exercises for 5 minutes which includes stretching of biceps, triceps, pectorals, lateral flexors of trunk, quadriceps, hamstring and calf muscle. stretching session included 30second (three sets of 10 second) of stretch for each muscle with 15 second relaxation after each muscle stretch was given.

2. Theraband exercise was given for 21 minute (3set of 10 repetation,30second for 1 repetition and) for following muscles- trapezeus,biceps,triceps,deltoid,pectorals,quadriceps,hamstring,hip adductor and abductor, calf, abdominals and spinal muscle.

3. Dumbbell exercise was given for 5 minute(2 sets of 10 repetition 20 second for 1 repetition with 10 second rest period after each repetition) included chest press, shoulder press, biceps curl ,triceps extension and abdominal crunches.

4. Squatting for 1 minute(2set of 10 repetition for 30 second and 10 second rest period after ach repetition)

5. Lunges for 1 minute(2set of 10 repetition for 30 second and 10 second rest period after each repetition)

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6. Bridging for 1 minute (2set of 10 repetition for 30 second and 10 second rest period after ach repetition) Wrap a resistance band around the thighs. The elastic band should be tight and provide resistance to thigh and buttocks muscles. Tighten the muscles of abs and buttocks and hold throughout the movement.

7. Cool down for 5minute which included stretching of biceps, triceps, pectorals, lateral flexor of trunk, quadriceps, hamstring and calf muscle and rest period for 15 second after each muscle stretch include deep breathing exercise.

All the above exercise was done regularly by the subjects for 4 weeks (5 days per week) and pre and post BP reading were statistically compared to find the effect of resistance exercise.

STATISTICAL ANALYSIS- The statistical software namely SPSS 20 version was used for the analysis of data & Microsoft Word and Microsoft Excel Worksheet have been used to generate graphs, tables etc.

Result

The frequency and its percentage distribution of pre-hypertensives was according to the BP reading of day first. data represents among 20 patients of prehypertension in aerobic exercise was 1(5.0%) were having BP 130/70mmhg and 140/90mmhg, in 2(10.0%) were having BP 140/100 mmhg ,in 5(25.0%) were having BP 130/100mmhg and in 11(55.0%)were having BP 130/90mmhg.

Frequency and its percentage distribution of pre-hypertensives was according to the BP reading of day 15th.data represents among 20 patients of prehypertension in aerobic exercise in this 2(10.0%)were having BP 130/100mmhg,3(15.0%) were having BP 130/90mmhg,4(20.0%)were having BP 130/80mmhg, 5(25.0%)were having BP 120/90mmhg,6(30.0%)were having BP 120/80mmhg**.**

The frequency and its percentage distribution of pre-hypertensives was according to the BP reading of day 30th.data represents among 20 patients of prehypertension in aerobic exercise in this 2(10.0%) were having BP 130/80mmhg,4(20.0%)were having BP 120/90mmhg and 130/90mmhg,10(50.0%)were having BP 120/80mmhg.

The frequency and its percentage distribution of pre-hypertensives was according to the BP reading of day first .data represents among 20 patients of prehypertension in resistance exercise was 1(5.0%)were having BP 130/80mmhg and 140/100mmhg,7(35.0%) were having BP 130/100mmhg,11(55.0%)were having BP 130/90mmhg.

The frequency and its percentage distribution of pre- hypertensives was according to the BP reading of day 15th. Data represents among 20 patients of prehypertension in resistance exercise was 1(5.0%)was having BP 130/100mmhg,4(20.0%) were having 120/80mmhg,7(35.0%)were having 120/90mmhg,8(40.0%)were having 130/90mmhg.

The frequency and its percentage distribution of pre-hypertensives was according to the BP reading of day 30th.data represents among 20 patient's of prehypertension in resistance exercise was 1(5.0%) was having BP 130/80mmhg,5(25.0%)were having 130/90mmhg,7(35.0%)were having 120/80mmhg and 120/90mmhg.

The mean column in the paired sample t test displays the average difference between before and after 15th day training (2.6), 15th to 30th (0.65) and the base line to 30th day (3.25) changes in aerobic group.

The mean column in the paired sample t test displays the average difference between before and after 15th day training (2.25), 15th to 30th (0.7) and the base line to 30th day (2.95) changes in resistance group. The standard deviation column displays the standard deviation of the average difference in BP reading.

Discussion

High blood pressure, termed "hypertension," is a condition that afflicts almost 1 billion people worldwide and is a leading cause of morbidity and mortality.Therefore, this disease is sometimes called the "silent killer."

The management of high blood pressure is considered a priority objective in primary and secondary prevention of cardiovascular disease. An aerobic exercise is an increase in oxygen consumption and heart rate that parallels the intensity of the imposed activity and a curvilinear increase in stroke

volume while resistance training offers greater development of muscular strength, endurance and mass.

S R Collier et al. found the effect of four weeks of aerobic and resistance exercise training on arterial stiffness, blood flow and blood pressure in pre-hypertension and stage 1 hypertensive found that resistance exercise resulted in increased arterial stiffness whereas aerobic exercise training decreased arterial stiffness in individuals with pre-hypertensive to essential hypertension despite similar reductions in blood pressure.[18]

Sambhaji Gunjal et al. found that the effect of aerobic interval training on blood pressure and myocardial function in hypertensive patients and showed significant reduction in blood pressure, improvement in cardiac function, aerobic capacity and reduction of mean heart rate.[19]

Fabio T Montrezol et al. concluded that the resistance training promotes a reduction in blood pressure and an improvement in muscle strength. Resistance training increased circulating levels of adiponectin and reduced the levels of plasma Intracellular Adhesion Molecule-1.[20]

In summary, the result of our study revealed that both treatment techniques were effective in reducing systolic blood pressure, diastolic blood pressure but statically there was significant difference between both the groups at the end of 4th week. So, the result lead us to reject the null hypothesis thereby confirming that there will be significant difference between effectiveness of aerobic and resistance training in reducing blood pressure in pre-hypertensive patients.

Limitation of study:

- Sample size taken for the study was small.
- Long term effect of the maneuver was not assed in our study

Scope for further study:

Based on the outcome of the statistical analysis, it is suggested that the future studies can be modified to accommodate the following changes:

- Long term effect can be considered.
- Study with large sample size are recommended

Conclusion

The study was conducted to find out and compare the effect of aerobic exercise training and resistance exercise training in adult with prehypertension. We can conclude that with the help of independent t test and levene's test that there are no significant comparative differences between aerobic exercise and resistance exercise in prehypertension the significant value is 0.247 this is greater then 0.05 accepts the null hypothesis, we can assume that the groups (aerobic and resistance)have equal variances.

Thus, this study accepts the first statement of alternate hypothesis(H_1) i.e; there is a significant effect of aerobic exercise and resistance exercise in prehypertension. And this study also accepts the second statement of null hypothesis(H_0) i.e; there are no significant comparative difference between aerobic exercise and resistance exercise in prehypertension.

Bibliography

1. Chobanian AV, Bakris GL, Black HR, Cushman WC, Green LA, Izzo JL Jr, Jones DW, Materson BJ, Oparil S, Wright JT Jr, Roccella EJ; National High Blood Pressure Education Program Coordinating Committee. Seventh report of the Joint National Committee on Prevention, Detection, Evaluation, and Treatment of High Blood Pressure. Hypertension. 2003;42: 1206–1252

2. Carretero OA, Oparil S; Oparil (January 2000). "Essential hypertension. Part I: definition and etiology". Circulation 101 (3): 329–35. doi:10.1161/01.CIR.101.3.329.PMID10645931.

3. Pescatello LS, Franklin BA, Fagard R, Farquhar WB, et al. 2004. Exercise and hypertension. Medicine and Science in Sports and Exercise 36(3): 533-53.

4. Bacon S, Sherwood A, Hinderliter A, Blumenthal JA. 2004. Effects of exercise,diet and weight loss on high blood pressure. Sports Med 34(5):307-316.

5. Pescatello LS, Franklin BA, Fagard R, Farquhar WB, et al. 2004. Exercise an hypertension. Medicine and Science in Sports and Exercise 36(3): 533-53.

Swati Sehgal, Jeban Daniel, Mayuri Sharma. / A Comparative Study to Find the Effect of
Aerobic Exercise Training Versus Resistance Exercise Training in Adults with Pre-Hypertension

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6. Wang Y, Wang QJ. The prevalence of prehypertension and hypertension among US adults according to the new Joint National Committee guidelines.Arch InternMed. 2004; 164: 2126–2134.

7. Greenlund KJ, Croft JB, Mensah GA. Prevalence of heart disease and stroke risk factors in persons with prehypertension in the United States, 1999–2000.Arch Intern Med. 2004; 164: 2113–2118.

8. Essential hypertension : The Lancet" Retrieved 2009-06-01

9. Gupta R. Meta-analysis of prevalence of hypertension in india. indian heart journal J 1997;49:43-8.

10. Ferguson TS, Younger N, Tulloch-Reid MK, et al. Progression from prehypertension to hypertension in a Jamaican cohort: incident hypertension and its predictors. West Indian Med J. 2010;59:486-93.

11. Arima H, Murakami Y, Lam TH, et al. Effects of prehypertension and hypertension subtype on cardiovascular disease in the Asia-Pacific Region. Hypertension. 2012; 59:1118-23.

12. L.George,(2014). Said that Patients with prehypertension are encouraged to follow lifestyle modification

13. Pescatello LS, Franklin BA, Fagard R, Farquhar WB, et al. 2004. Exercise and hypertension. Medicine and Science in Sports and Exercise 36(3): 533-53.

14. Meredith IT, Jennings GL, Esler MD, et al. Time-course of the antihypertensive and autonomic effects of regular endurance exercise in human subjects. J Hypertens. 1990;8(9):859–66.

15. Hagberg, J. M. (1990). Exercise, fitness and hypertension. In C. Bouchard, R. J. Shephard, T. Stephens, J. R. Sutton, & B. D. McPherson (Eds.), Exercise, fitness and health: A consensus of current knowledge (pp. 455-466). Champaign: Human Kinetics.

16. Collier SR, Kanaley JA, Carhart R Jr, et al. The effect of 4 weeks of aerobic or resistance exercise training on arterial stiffness, blood flow and blood pressure in pre and stage–1 hypertensives. Journal of human hypertension. 2008;22(10):678–686.

17. Sambhaji Gunjal, Neesha Shinde, Atharuddin Kaz. Effect of aerobic interval training on blood pressure and myocardial function in hypertensive patients. International Journal of Pharmaceutical Science. 2013;2(6):27–31.

18. Fabio TM, Hanna KMA, Vania DA, et al. Resistance training promotes reduction in blood pressure and increase plasma adiponectin of hypertensive elderly patients. J hypertension. 2014;3:6

The Effect of Group Activity Therapy on Patients' Independence Level in Controlling Hallucinations at Bogor Mental Health Clinic

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Abstract

Backgrounds: Schizophrenia is a severe mental disorder, in which a person experiences disturbances in thoughts, behavior and usually involves hallucinations.Group activity therapy is a type of therapy that isperformed on a group of patients who have mental disorders. The purpose of group activity therapy is to help patients socialize with other people and can change maladaptive behavior into adaptive behavior.

Aim: This study is aimed to examine the effect of group activity therapy on patient's independence level in controlling hallucinations at Bogor Mental Health Clinic.

Methodology: This study used pre-experimental research with one group pretest-posttest design with a questionnaire that contained patient's level of independence in controlling hallucinations before and after being given Group Activity Therapy. The research was carried out at Bogor Health Mental Clinic, Bogor City during March-December 2021 with a total sample of 42 participants and the sampling technique used was purposive sampling. The data analysis technique used prerequisite tests (normality and homogeneity) and statistical tests with Paired T-Test or the Wilcoxon rank test.

Result: From total sample of 42 participants, there were 25 participants (59.5%) in the category of less independent in controlling hallucinations during the pre-test and there were 30 participants (71.4%) in the category of being quite independent during the post-test with Asymp.Sig scores (2- tailed) 0.000 <0.05.

Conclusion: There was a significant effect of group activity therapy on the patient's independence level in controlling hallucinations at Bogor Mental Health Clinic.

Keywords: Group Therapy Activity, Hallucinations, Independence level

Introduction

Data from the World Health Organization (2016) showed that the number of people with mental disorders in in the world currently reached around 236 million people[1].The mild mental disorders affect 6% of the population while 0.17% of the population sufferfrom severe mental disorders. A total of 60 million people suffered from bipolar disorder and47.5 million people were affected by dementia. Around 35

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million people in the world suffer from depression and it is a disease with the 4th rank in the world. [1]

Mental disorders are condition in which a person experiences disturbances in thoughts, behavior, and feelings that are manifested in the form of a set of symptoms or significant behavioral changes and can cause suffering and obstacles in carrying out people's functions as humans.

The type of therapy used in treating people with mental disorders, namely, pharmacological and non-pharmacological therapies.Pharmacological therapy is therapy using drugs. Drugs that are given are psychopharmaceutical or psychotropic types that provide a direct therapeutic effect on the patient's mental process and it willprovide a calming effect and improve overall conditionof the patient.Non-pharmacological therapy includes group activity therapy.

Group activity therapy is therapy carried out by nurses on a group of patients who have mental disorders.The purpose of group activity therapy is to help patients socialize with other people and can change maladaptive behavior into adaptive behavior. In this therapy, patients are trained to perceive the stimulus provided or experienced by reading articles, magazines, watching tv or do creative art and crafts. Patient will learn how to solve problems that arise from the stimulus.

Group activity therapy provides benefits that will help mental disorder patients to socialize again. By bonding with others who are also attempting to overcome their disease effects especially negative symptoms, the patient is reminded that he or she is not alone.[18]

The group activity therapies that focused on the patient's independence level in controlling hallucinations were done within small scope at Bogor Mental Health Clinic. Thus, the researchers were interested to perform further study regarding the effect of group activity therapy on patient's independence level in controlling hallucinations at Bogor Mental Health Clinic.

Methodology

The research was carried out at Bogor Health Mental Clinic, Bogor City during March-December 2021 with a total sample of 42 participants. This study used pre-experimental research with one group pretest-posttest design with a questionnaire that contained patient's level of independence in controlling hallucinations before and after being given Group Activity Therapy. The sampling technique used was purposive sampling. The data analysis technique used prerequisite tests (normality and homogeneity) and statistical tests with Paired T-Test or the Wilcoxon rank test.

Results

Table 1. Frequency Distribution of Patient's Independence Level in Controlling Hallucinations during Pre-test at Bogor Mental Health Clinic

Independence Level in Controlling Hallucinations	Frequency	Percentage
Independent	17	40.5
Less Independent	25	59.5
Total	42	100

Based on the results of table 1 above, it is known that the frequency distribution of the patient's level of independence in controlling hallucinations during the pre-test at Bogor Mental Health Clinic showed that out of 42 participants, 25 participants (59.5%) were less independent in controlling hallucinations.

Table 2. Frequency Distribution of Patient's Independence Level in Controlling Hallucinations during Post-test at Bogor Mental Health Clinic

Independence Level in Controlling Hallucinations	Frequency	Percentage
Independent	30	71.4
Less Independent	12	28.6
Total	42	100

Based on the results of table 2 above, the frequency distribution of the patient's level of independence in controlling hallucinations during the post-test at Bogor Mental Health Clinic showed that from 42 participants, there were 30 participants (71.4%) who were independent after intervention with group activity therapy.

Table 3. Homogeneity Test

Levene Statistic	df1	df2	Sig.
772	1	82	0,382

Table 3 showed that the results of the Homogeneity Test using the Levene Statistic formula is 0.382. and this means that the data comes from populations with homogeneous variance.

Table 4. Normality Test with Shapiro-Wilk

	Statistic	df	Sig.
Pre-test	.910	42	.003
Post-test	.791	42	.000

Based on the results of table 4 above, the Sig. value was 0.003 at the pre-test and 0.000 at the post-test. Thus, the significant value < 0.05 and the data distribution was not normal.

Table 5. Non-Parametric Hypothesis Test Results

	Pretest - Posttest
Z	-5.418[b]
Asymp. Sig. (2-tailed)	.000

Table 5 showed that Asymp.Sig (2-tailed) value was 0.000 and the value is 0.000 < 0.05 (Ho was rejected, Ha was accepted). Therefore, there was a significant difference between the results of the pre-test before intervention with group activity therapy and the post-test results after group activity therapy.

Discussion

A. Patient's Level of Independence in Controlling Hallucinations during Pre-test

Based on the results of research from 42 participants, most of the participants had good independency in controlling hallucinations, while 25 participants (59.5%) were in the category of less independent.

The result of this study inline with the research by Vevi Suryenti which showed that 13 participants (65%) had less independency in controlling hallucinations before group activity therapy.[6]

In psychotic disorder cases, patients usually experience inability to care for himself, impaired social relations, hallucinations, behavioral disorders, incoherence and self-abandonment so that it interferes with the patient's independence. Independence is the ability to control and regulate one's own thoughts, feelings, and actions freely and try to overcome feelings of shame or doubt.

Independence is not something that appears suddenly, but it needs a habit to perform it. The following characteristics could be found in people who do not have independence: unable to make decisions, not confident, unable to restrain themselves, unable to control themselves, and does not have any sense of responsibility for themselves. Hallucination is the loss of human ability to distinguish between internal and external stimuli.

According to the analysis, the researcher concluded that the patient's level of independence in controlling hallucinations was categorized as less independent if the participant had difficulty receiving information due to lack of ability to concentrate. Patients who experience mental disorders have reduced cognitive abilities because biologically the size of the frontal lobes is smaller than the average normal person and this condition leads to disorientation, incoherence, and difficulty thinking logically. When the participants experience hallucinations, they were unable to control it independently.

B. Patient's Level of Independence in Controlling Hallucinations during Post-test

Based on the results from this study, out of 42 participants, 30 participants (71.4%) had good independency level after intervention with group activity therapy.

This finding is line with the research conducted by Dwi Handayani, et.al, which stated that the patient's independence level in controlling hallucinations after participating in the perceptual stimulus group activity therapy were increasing, with supportive level 28.6%, partially 61.9% and wholly 9.5%. [10]Self-care depends on the behavior that has been learned, while individuals take the initiative and form themselves to maintain their life, health, and well-being.[11]

Perception stimulation group activity therapy in patients who experience hallucinations aims to

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train patients to perceive the stimulus provided or the stimulus provided or the stimulus has been experienced.[11]

According to the analysis, the researchers concluded that most of the participants were quite independent in controlling hallucinations after being given group activity therapy. This is based on the number of patients who experience changes after exposure with group activity therapy.

C. The Effect of Group Activity Therapy on Patient's Independence Level in Controlling Hallucinations at Bogor Mental Health Clinic

The results of the bivariate analysis showed that from 42 participants, there were 25 participants (59.5%) in the category of less independent in controlling hallucinations during pre-test and 30 participants (71.4%) in the category independent during the post-test with Asymp.Sig scores (2- tailed) 0.000 <0.05 and there was a significant effect of group activity therapy on the patient's level of independence in controlling hallucinations.

The results of this study is in line with research conducted by Widya Sepalanita[12] and Livana [13] which stated that group activity therapy with perceptual stimulation could be used to control hallucinations, with 41% participants showed increased ability to control hallucinations independently.[13]

Group activity therapy is a form of modality therapy based on learning interpersonal relationships. By joining a group, participants can exchange ideas and experiences, and develop new patterns of behaviour.

Group activity therapy is often used in mental health practice and it is an important part of therapeutic skills in nursing.[16] The patient's ability to control hallucinations can be controlled by group therapy activity stimulation of hallucinations perception. This therapy uses activities as a stimulus and is related to experiences in life to be discussed in groups.[8] The use of group therapy in mental nursing practice will have a positive impact on prevention, treatment or therapy and health restoration efforts. This perceptual stimulation group activity therapy is an effort to motivate thinking processes, recognize hallucinations, train patients to control hallucinations and reduce maladaptive behaviour.[17]

Based on the results of the research and the theories above, the researchers conclude that group activity therapy is a very effective method to increase the patient's independence in controlling hallucinations. When the participant participates in group activity therapy regularly, the participant will get used to socializing, exchanging ideas, and being able to change maladaptive behaviour into adaptive ones and resulted in positive impact in each respondent.

Conclusion

From the results of this study, it can be concluded that there was an effect of group activity therapy on the level of patient independence in controlling hallucinations at Bogor Mental Health Clinic.

References

1. World Health Organization. Mental Disorders. World Health Organization. https://www.who.int/en/ Accessed January 5, 2022, at 17.00 WIB; 2016.

2. Riskesdas. Main Results of Riskesdas Jakarta : Ministry of Health of the Republic of Indonesia.http://kesmas.kemkes.go.id/ Accessed January 5, 2022 at 19.00 WIB; 2018.

3. Notoadmojo, Soekidjo. Health Research Methodology. Jakarta : Rineka Cipta; 2019.

4. RI Law No. 18. Mental Health. Jakarta: Ministry of Health of the Republic of Indonesia; 2014.

5. Kusumawati, Farida and Yudi Hartanto. Textbook of Mental Nursing. Jakarta : Salemba Medika; 2012.

6. Vevi Suryenti Putri. The Effect of Perception Stimulation Group Activity Therapy on the Ability to Control Hallucinations in Schizophrenic Patients in the Arjuna Inpatient Room in Jambi Province, Baiturahman Jambi Academic Journal; 2018.

7. D, Emilyani. The Effect of Supportive Group Therapy on the Independence of Schizophrenic Patients Experiencing a Self-Care Deficit in the Mental Hospital of NTB Province, Jurnal Bioscience Medical Analyst. DOI : https://doi.org/10.32807/jambs.v2i2.45; 2019.

8. Asori, Muhammad. Learning Psychology. Bandung : CV Wacana Prima; 2013.

9. Kusumawati, Farida and Yudi Hartanto. Textbook of Mental Nursing. Jakarta : Salemba Medika; 2012.

10. Handayani, Dwi. The Patient's Level of Independence in Controlling Hallucinations After Group Activity Therapy, Padjadjaran Nursing Journal; 2022.

11. Muhlisin and Indrawati. Orem's Self-care Theory and Approaches in Nursing Practice, Nursing Science News; 2010.

12. Sepalanita, Widya and Wittin Khairani. The Effect of Group Activity Therapy with Perceptual Stimulation on the Ability to Control Hallucinations in Schizophrenic Patients. Jambi: Ministry of Health Poltekes Jambi. Scientific Journal of Batanghari University Jambi, 19 (2) 426-431, DOI : https://doi.org/http://dx.doi.org/10.33087/jiubj.v19i2.690; 2019.

13. Livana, PH, Ruhimat, IIA, Sujarwo, S., Suerni, T., Kandar, K., Maya, A., & Nugroho, A. Increasing the Patient's Ability to Control Hallucinations Through Perception Stimulation Group Activity Therapy. Journal of NersWidyaHusada, 5 (1), 35-40. DOI : https://doi.org/https://doi.org/10.33666/jners.v5il.328; 2020.

14. Hidayah, Afifah Nur. The Effect of Sensory-Perception Stimulation Group Activity Therapy on the Ability to Control Hallucinations in Hallucinating Patients in RSJD DR. Amino Gundohutomo. Semarang : E-Journal of Muhammadiyah University of Semarang. https://jurnal.unimus.ac.id/; 2015.

15. Herawati, N., Syahrum, S., Sumarni, T., Yulastri, Y., Gafar, A., &Dewi, S. The Effect of Perception Stimulation Group Activity Therapy on Controlling Ability of Hallucinations in Patients with Schizophrenia. Indonesian Journal of Global Health Research, 2(1), 57–64. DOI:https://doi.org/10.37287/ijghr.v2i1.65; 2020.

16. See Budi Anna. Mental Nursing Group Activity Therapy. EGC : Jakarta; 2014.

17. Ningsih, P., Murtiani, M., & Ilyas, M. The Effect of Perception Stimulation Group Activity Therapy on the Ability to Control Hallucinations in Patients with Hallucinations in the Kenanga Room at the Regional Special Hospital of South Sulawesi Province. Scientific Journal of Health Diagnosis, 2(4), 28–34.http://ejournal.stikesnh.ac.id/index.p hp/jikd/article/view/440; 2013.

18. Drori, T., Guetta, H., Natan, M., & Polakevich, Y. Nurse intention to implement creative group activities among psychiatric patients. Perspectives in Psychiatric Care; 2014.

Clinical Spectrum of Mucormycosis among COVID -19 Patients Attending Tertiary Health Care Facility: Hospital based Descriptive Study

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Abstract

Diabetes Mellitus predisposes patients to invasive fungal infections. There has been a recent surge of Mucormycosis with COVID 19 infection particularly in patients with diabetes. This study aims to study the clinical spectrum of CAM (COVID -associated Mucormycosis) with diabetes and subsequent outcomes.

Material and methods: Descriptive study was conducted among the patients attending Ophthalmology OPD in a Tertiary Care Centre in Telangana with COVID Associated Mucormycosis(CAM) from March 2021 to June 2021.

Results: Among 200 patients who attended OPD with CAM, Diabetes Mellitus was the most common co-morbidity. The majority of the patients had poor glycaemic control with a mean HbA1c of 9.06%. Pre-existing diabetes mellitus (DM) was present in 84% of cases. Out of the total study population, 89% had prior exposure to high dose corticosteroids.

Conclusion: The disease has surged in COVID 19 pandemic due to uncontrolled diabetes and improper corticosteroid use.

Keywords: COVID Associated Mucormycosis CAM, Mucormycosis, COVID- 19, Diabetes mellitus, Corticosteroids

Introduction

Severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2), a form of β-Coronavirus of the Coronaviridae family, has been causing infection among humans worldwide leading to a pandemic emergency. There are more than 170 million confirmed COVID-19 cases worldwide with over 3.5 million deaths as of May 2021[1].

New strains of SARS-CoV-2 have been evolving unceasingly, presenting with various systemic and ocular manifestations. There has been an increase in the incidence of secondary infection in the coronavirus infected individual either due to pre-existing factors or the virus by itself is causing such

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infection, which is still unclear. There has been reports of increased incidence of fungal infections in patients with COVID-19. There were earlier reports of COVID associated Pulmonary Aspergillosis (CAPA) and candidemia[2,3]. However, recently there has been sudden surge in cases of Mucormycosis in patients with COVID-19[4].

Mucormycosis is a formidable angioinvasive opportunistic infection in an immunocompromised host. The spectrum of mucormycosis involves rhino-orbital-cerebral, pulmonary, disseminated, cutaneous, gastrointestinal and disseminated form of disease.

The major risk factors for the disease are diabetes, neutropenia, iron overload, malignancy and organ transplant[5]. As it is already known, immunocompromised and uncontrolled diabetic patients have an increased chance of developing mucormycosis Diabetes is the most common metabolic disorder and is an independent risk factor for Severe COVID-19 and Mucormycosis. In patients with diabetes, affected with COVID-19 superinfection with Mucormycosis may present with a swelling in the left cheek, eye, and avascular necrosis intraorally, post COVID-19 infection and may lead to adverse clinical outcome and prolonged hospital stay. This study aims to study the clinical spectrum of Mucormycosis in patients with COVID-19 and diabetes and their subsequent outcomes.

Material and Methods

Study Design: hospital based descriptive study

Study setting: Ophthalmology OPD in a Tertiary Care Centre in Telangana

Study duration: The study period was for a period of 1year from March 2021 to June 2021.

Study population: Patients attending Ophthalmology OPD in a Tertiary Care Centre in Telangana during the study period.

Inclusion criteria:

- Laboratoryconfirmed COVID-19 cases by RTPCR (Real Time Reverse Transcription Polymerase Chain Reaction) nasopharyngeal & throat swab with COVID Associated

Mucormycosis (CAM) presenting with complaints related to eye.

- Patients willing to participate in the study and who gave informed written consent.

Sample size: 200 patients

Study tool: pre-tested semi structured questionnaire

Study Variables: Socio-demographic variables, Case-history, symptoms, risk factors like co-morbidities, Hospital case sheets, Lab reports, CT/MRI reports.

Methodology: Patients attending the Ophthalmology out patient department (OPD) came with the COVID Associated Mucormycosis (CAM) presenting with complaints related to eye were given appropriate management and followed till discharge. All the relevant data was collected during their stay in the hospital.

Operational definitions:

- **Severe COVID-19 infection** was defined by Sp02 < 90% or Respiratory rate >30/min at admission or during hospital stay. Post COVID 19 cases were defined who had either clinical recovery from respiratory symptoms or had passed 28 days since the onset of symptoms of COVID 19.

- **Mucormycosis** was defined by clinico-radiological suspicion with visualisation of broad branched aseptate fungal hyphae on KOH mount direct microscopy and histopathology specimen by fungal stains or isolation of zygomycetes on fungal culture.

Permissions and Ethical considerations:

- Permission was obtained from Institutional heads ie. Superintendent and Head of the department of Ophthalmology. Written informed consent was taken from patients. Institutional Ethics Committee approval was taken. Patient confidentiality was ensured.

- **Statistical analysis**

Data was compiled in MS Excel and analysed using SPSS ver 20.0. Descriptive statistics were presented as mean and standard deviation for quantitative variables and as frequencies with percentages for qualitative data.

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Results

Demography

During the study period, 200 patients were hospitalized had CAM (COVID-Associated Mucormycosis). All the patients were admitted in the Covid ward attached to Tertiary Care Centre Sarojini Devi eye hospital, Hyderabad.

The mean age of patients was 58.28 (±8.57) yrs. In 200 patients with CAM, 72% were males and the rest 28% were females. It was observed that mucormycosis was predominantly seen in males (72%) as compared to females as depicted in Figure:1
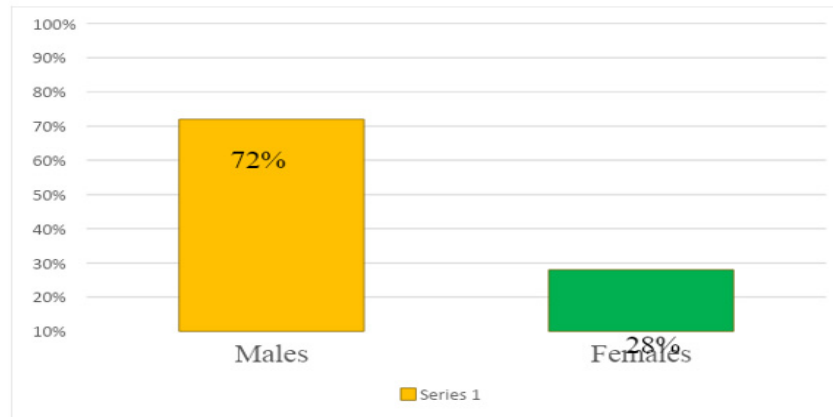
Figure: 1 Gender wise distribution of patients with Mucormycosis
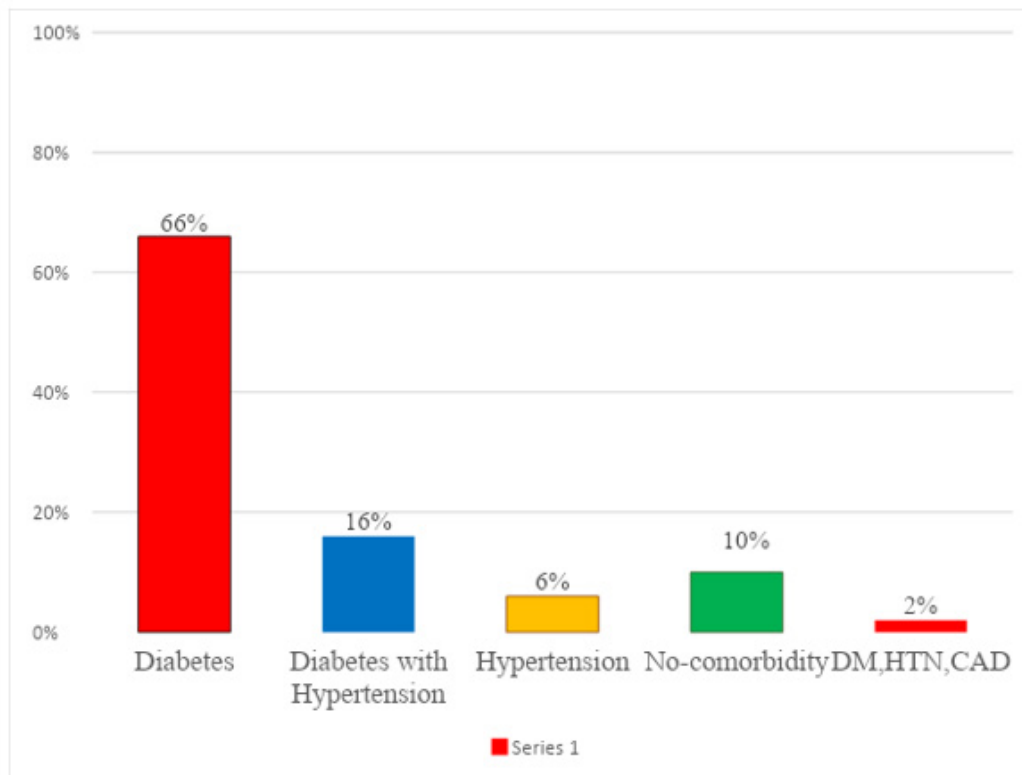
Figure: 2 Distribution of Co-morbidities among the patients with mucormycosis

In patients with CAM, pre-existing diabetes mellitus (DM) was present in 84% of cases while 66% had diabetes only as the most frequent co-morbidity followed by Diabetes with Hypertension among 18% and only Hypertension among 6%, 2% had coronary artery disease with Diabetes with Hypertension

and 10% did not have any co-morbid conditions as depicted in figure:2.

Table 1:

| Co-morbidities	No (%)
Diabetes	66(66%)
Diabetes, Hypertension	18(18%)
Hypertension	6(6%)
Diabetes, Hypertension with Coronary artery disease	2(2%)

Table: 1 show that diabetes was considered to be most common comorbidity associated with mucormycosis. In patients with diabetes, mean blood glucose was 232.63 (±82.81) g/dl with mean glycated haemoglobin (HbA1c) of 9.06% (±2.19) at admission. There were no patients with diabetic ketoacidosis in our study.

The majority of the patients, 89% had history of steroid exposure in form of either dexamethasone and methylprednisolone. The duration and amount of exposure could not be determined as it varied due to physician preference and intake of OTC (over the counter) steroid by the patients. None of our patients received anti- IL6 therapy or monoclonal antibodies. There were no cases of malignancy, organ transplant or HIV/AIDS with Mucormycosis in the present study.

Clinical presentation

In Patients with CAM 51% had nasal symptoms in form of rhinorrhoea & nasal stuffiness, block and 49% had eyes symptoms in form of redness or eye pain, oedema associated with facial swelling, matting of eye lashes, ptosis, proptosis as depicted in figure: 3.

On admission, all patients presented with CAM. All the patients with Rhino orbital involvement are admitted and given Amphotericin Intravenous injections 3 doses, intraorbital injections inpatients with orbital apex involvement, Posaconazole for 60 days, All patients recovered and discharged. No deaths were reported during the hospital stay.
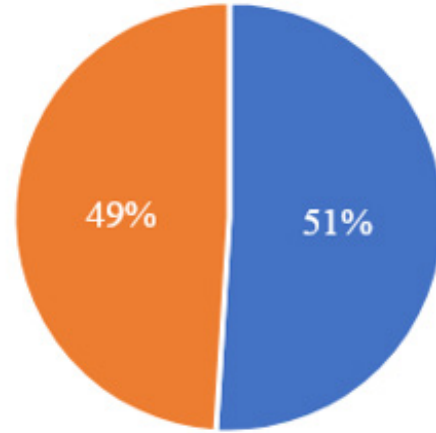
■ Nose,Sinus involvement   ■ Rhino-orbital

Figure 3: Distribution of patients based on clinical presentation

Contrast Enhanced Commuted Tomography/ MRI Paranasal Sinuses revealed 49 % with Rhino-orbital involvement. Among the Nose and Paranasal sinuses, (Maxillary and Ethmoid sinus) were predominantly involved in 51 % cases. We had one patient with Maxillary, frontal and Ethmoid sinus and one patient with maxillary, sphenoid and ethmoidal sinus involvement and 3 patients with rhino orbito cerebral involvement

There were no patients with pulmonary or disseminated Mucormycosis. The diagnosis of Mucormycosis was confirmed with microscopy 85%, histopathology 80% and by culture in 27% cases.

Treatment and outcome

In all the Patients endoscopic debridement of sinuses was done along with intra orbital wash with Lyposomal Amphotericin B was done to patients with orbital involvements following which liposomal Amphotercin B was given intra orbitally for 3 days along with IV Amphotercin B followed by Posaconazole for 60 days with glycaemic control. Exenteration was required for 8 eyes who presented late with orbital apex involvement.

Discussion

Around 14,872 cases of CAM have been notified in India as of May 28, 2021[4]. The present surge in Mucormycosis cases is possibly due to the high

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burden COVID-19 in the country. The mean duration of onset of Mucormycosis was 16.18 (±11.36) days after the onset of COVID-19.

In the present study, it was observed that mucormycosis was predominantly seen in males (72%) as compared to females. Similar findings were reported systematic review done by **Singh AK et al in 2021**[6] study where mucormycosis was predominantly seen in males (78.9%).

In the present study, Diabetes was associated in our study with 84% similarly in a study done by **Y. Mishra, M. Prashar, D. Sharma et al. in 2021**[7], it was reported to be 87.5%.Similar findings were reported systematic review done by **Singh AK et al in 2021**[6] study, where Pre-existing DM accounted for 80% of cases, while concomitant DKA was present in nearly 15% of people with mucormycosis and COVID-19.

In the present study among patients with diabetes, mean blood glucose was 232.63 (±82.81) g/dl with mean glycated haemoglobin (HbA1c) of 9.06% (±2.19) at admission. Similarly in a study done by **Y. Mishra, M. Prashar, D. Sharma et al. in 2021**[7], it was reported to 242.63 (±84.81) g/dl & mean glycated haemoglobin (HbA1c) of 9.06% (±2.19) at admission.

Diabetes is the most frequent co-morbidity in Mucormycosis in about 73.5% in India [8]. However, in western countries diabetes is associated with 17% cases of Mucormycosis[9] Incidence of Mucormycosis is around 1.6 cases/1000 patients with diabetes[10].

History of corticosteroid intake for the treatment of COVID-19 was present in 89% of the patients whereas it was 76.3% in **Singh AK et al study done in 2021**[6].

In the present study, Commonest organ involved with mucormycosis was nose and sinus were 51 % followed by Rhino-orbital involvement (49%). Maxillary and Ethmoid sinuses were predominantly involved.

Singh AK et al study done in 2021[6]**, found that** Commonest organ involved with mucormycosis was nose and sinus (88.9%), followed by rhino-orbital (56.7%) and ROCM type (22.2%).

Prognosis is improved in cases of Sino-nasal disease with early surgical debridement and mortality has not been reported in the present study whereas it was 12.5% in **Y. Mishra, M. Prashar, D. Sharma et al. in 2021**[7] **to** be less than 10% in a study done by **Nithyanandam S, Jacob in 2003**[11]In contrast it was 30.7% in Singh **AK et al study done in 2021**[6]**.**

The mortality appears to be less in our case possibly due to early diagnosis with early surgical debridement. However, we did not have any patients with pulmonary and disseminated Mucormycosis disease. Moreover, we did not have any patients with hematological malignancy or organ transplant.

There are numerous reasons for the emergence of Mucormycosis in COVID 19. In our study diabetes was the most common comorbidity. Diabetes mellitus and COVID-19 share a bidirectional relationship with adverse outcomes. Diabetes is a proinflammatory state which leads to deficient control of SARS-CoV-2 replication and severe COVID 19 infections [12]. SARS-CoV-2 infection leads to decreased insulin secretion due to direct pathogenic effect on pancreatic islet cells. It also induces insulin resistance due to transient hyper-inflammatory state[13]. Subsequently, a state of hyperglycemia is produced leading to the growth of invasive mucormycosis.

Corticosteroids are considered essential therapy in patients with COVID 19 on supplemental oxygen[14]. Though traditionally, usage of prednisolone or equivalent 1 mg/kg for 3 weeks or more is considered a risk factor for Mucormycosis [15], certain case reports have shown occurrence of Mucormycosis after a short course of steroids [16]. The effect of corticosteroids in CAM is multifaceted.

First, they can lead to immunosuppression since they impair migration, phagocytosis and phagolysosome formation in the macrophages. Secondly, they lead to drug induced hyperglycemia and worsening of glycemic control in patients with diabetes.Moreover, in countries like India where it is available as Over the counter drugs, improper and prolonged steroid use could lead to increase susceptibility to Mucormycosis.[17]

SARS-CoV-2 infection causes endothelial dysfunction due to direct viral invasion and host inflammatory response causing apoptosis and pyroptosis of endothelial cells[18]. Diabetes

is a chronic inflammatory state associated with endothelial dysfunction[19]. Endothelial adhesion and angioinvasion are critical for invasion of Mucorales[5].

Thus, patients with diabetes with COVID-19 infection are at high risk for invasive Mucormycosis. Overall, hyperglycemia in patients with diabetes and COVID-19 on steroids contributes to risk of Mucormycosis .

India has high burden of Mucormycosis among patients with COVID-19 in the world[20]. The incidence has sharply risen during the second wave of COVID-19 with over 14,872 cases of mucormycosis till date[4].

Limitations:

It was a single centre study with limited cases of Mucormycosis and may not represent the full picture of the current state of the world. Moreover, we explored attributability of diabetes and COVID19 in the risk of Mucormycosis and did not have enough data for other risk factors like malignancy, neutropenia, HIV or organ transplant. We did not have a control group of patients without COVID-19 with Mucormycosis.

However, our study provides useful insights for demographic and clinical profile of CAM and its relation with diabetes.

Conclusion:

Mucormycosis is an angioinvasive fungal disease with significant morbidity and mortality. The disease has risen dramatically due to interplay of COVID 19 pandemic, uncontrolled diabetes and inappropriate corticosteroid use leading to pathogenic invasion and adverse outcomes. The treatment involves early detection, surgical debridement and antifungal drugs for better survival.

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References

1. Dong E, Du H, Gardner L. An interactive web-based dashboard to track COVID- 19 in real time. Lancet Infect Dis 2020 May;20(5):533e4.

2. Armstrong-James D, Youngs J, Bicanic T, Abdolrasouli A, Denning DW, Johnson E, et al. Confronting and mitigating the risk of COVID-19 associated pulmonary aspergillosis. Eur Respir J 2020 Oct;56(4):2002554.

3. Nucci M, Barreiros G, Guimar~aes LF, Deriquehem VAS, Casti~neiras AC, Nou_er SA. Increased incidence of candidemia in a tertiary care hospital with the COVID-19 pandemic. Mycoses 2021 Feb;64(2):152e6.

4. Raut A, Huy NT. Rising incidence of mucormycosis in patients with COVID-19: another challenge for India amidst the second wave? Lancet Respir Med 2021Jun. https://doi.org/10.1016/S2213-2600(21)00265-4.

5. Ibrahim AS, Spellberg B, Walsh TJ, Kontoyiannis DP. Pathogenesis of mucormycosis. Clin Infect Dis 2012 Feb 1;54(suppl_1):S16e22.

6. Singh AK, Singh R, Joshi SR, Misra A. Mucormycosis in COVID-19: A systematic review of cases reported worldwide and in India. Diabetes Metab Syndr. 2021 Jul-Aug;15(4):102146.

7. Yogendra Mishra a, *, Manoj Prashar b, Deepak Sharma a, Akash c, V.Pravin Kumar d, T.V.S.V.G.K. Tilak . Diabetes, COVID 19 and mucormycosis: Clinical spectrum and outcome in a tertiary care medical center in Western India. Diabetes & Metabolic Syndrome: Clinical Research & Reviews 15 (2021) 102196.

8. Patel A, Kaur H, Xess I, Michael JS, Savio J, Rudramurthy S, et al. A multicentre observational study on the epidemiology, risk factors, management and outcomes of mucormycosis in India. Clin Microbiol Infect 2020 Jul 1;26(7). 944.e9-944.e15.

9. Skiada A, Pagano L, Groll A, Zimmerli S, Dupont B, Lagrou K, et al. Zygomycosis in europe: analysis of 230 cases accrued by the registry of the European confederation of medical mycology (ECMM) working group on zygomycosis between 2005 and 2007. Clin Microbiol Infect 2011 Dec;17(12):1859e67.

10. Bhansali A. Presentation and outcome of rhino-orbital-cerebral mucormycosis in patients with diabetes. Postgrad Med 2004 Nov 1;80(949):670e4.

11. Nithyanandam S, Jacob MS, Battu RR, Thomas RK, Correa MA, D'Souza O. Rhino-orbito-cerebral mucormycosis. A retrospective analysis of clinical features and treatment outcomes. Indian J Ophthalmol 2003 Sep;51(3):231e6.

12. Hussain A, Bhowmik B, do Vale Moreira NC. COVID-19 and diabetes: knowledge in progress. Diabetes Res Clin Pract 2020 Apr;162:108142.

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13. Ceriello A, De Nigris V, Prattichizzo F. Why is hyperglycaemia worsening COVID -19 and its prognosis? Diabetes Obes Metabol 2020 Oct;22(10): 1951e2.

14. The RECOVERY Collaborative Group. Dexamethasone in hospitalized patients with covid-19. N Engl J Med 2021 Feb 25;384(8):693e704.

15. Varga Z, Flammer AJ, Steiger P, Haberecker M, Andermatt R, Zinkernagel AS, et al. Endothelial cell infection and endotheliitis in COVID-19. Lancet 2020 May;395(10234):1417e8.

16. Hadi HA, Suwaidi JA. Endothelial dysfunction in diabetes mellitus. Vasc Health Risk Manag. :24.

17. Singh AK, Singh R, Joshi SR, Misra A. Mucormycosis in COVID-19: a systematic review of cases reported worldwide and in India. Diabetes Metab Syndr Clin Res Rev [Internet]. 2021 May 21 [cited 2021 Jun 10]; Available from: https:// www.sciencedirect.com/ science/article/pii/S1871402121001570.

18. Varga Z, Flammer AJ, Steiger P, Haberecker M, Andermatt R, Zinkernagel AS, et al. Endothelial cell infection and endotheliitis in COVID-19. Lancet 2020 May;395(10234):1417e8.

19. Hadi HA, Suwaidi JA. Endothelial dysfunction in diabetes mellitus. Vasc Health Risk Manag. :24.

20. Prakash H, Ghosh AK, Rudramurthy SM, Singh P, Xess I, Savio J, et al. A prospective multicenter study on mucormycosis in India: epidemiology, diagnosis, and treatment. Med Mycol 2019 Jun 1;57(4):395e402.

Correlation of Socio Cultural Factors in Patients of Pelvic Inflammatory Diseases

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Abstract

Majority of the patients of PID are from low socio economic status. Unhygienic delivery, post partum infection, unsafe abortion procedures are observed to be linked to pelvic infection**.**The sequele to PID include chronic abdominal pain, infertility, ectopic pregnancy, etc. PID is the most serious complication of Sexually Transmitted Diseases**.** It is also related to the number of sexual partners. Social factors are very important in PID like age, educational status, marital status,socio economic status, religion, type of family etc. The present cross-sectional study was conducted in Gynaecological OPDs of the Department of Obstetrics and Gynaecology, Rural and Urban Health Training Centres (R.H.T.C & U.H.T.C) of the Department of Community Medicine in JN Medical College, AMU, Aligarh.The study was carried out for a period of one year, from 1st August 2001 to 31st July 2002. A total of 350 ever married females were selected on the basis of history of PID elicited. The aim of this study was to find the correlation of socio cultural factors in patients of PID. This study reported that unhygienic deliveries may give rise to more chances of pelvic infection. It also reported that abortion rate is more in lower social classes(III-V). The maximum cases of infertility were seen in the age group 25-29 years (37 cases).There were 51 cases presenting with primary infertility and 9 cases of secondary infertility. Damage to the female reproductive tract from PID is usually irreversible; therefore, prompt antibiotic treatment is necessary to prevent any scarring of the reproductive tract.

Key words: PID,correlation, social class ,delivery, abortion, infertility

Introduction

Pelvic Inflammatory disease (PID) is a serious syndrome of female reproductive system. It occurs due to spread of infections. (most often sexually transmitted infections) from the vagina and endocervix to the uterus, fallopian tubes and ovaries. It is more common in developing countries because of unhygienic conditions. By the turn of the 19th century, pelvic inflammation was thought to be mainly due to the uterus. Hydrosalpinx was first mentioned by Deckkers(1695). Of all the infertile women ,at least 15 % are infertile because of tubal damage caused by PID[1]. Following PID,scarring will cause approximately 20% of women to become

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infertile, 18% to develop chronic pelvic pain and 9% to have ectopic pregnancies[2].Majority of the patients of PID are from low socio economic status. Unhygienic delivery, post partum infection, unsafe abortion procedures are observed to be linked to pelvic infection [3].The sequele to PID include chronic abdominal pain,infertility, ectopic pregnancy, etc. PID is the most serious complication of Sexually Transmitted Diseases[4].It is also related to the number of sexual partners.Social factors are very important in PID like age,educational status,marital status, socio economic status,religion,type of family etc.

The aim of this study was to find the correlation of socio cultural factors in patients of PID.

Pelvic Inflammatory Disease
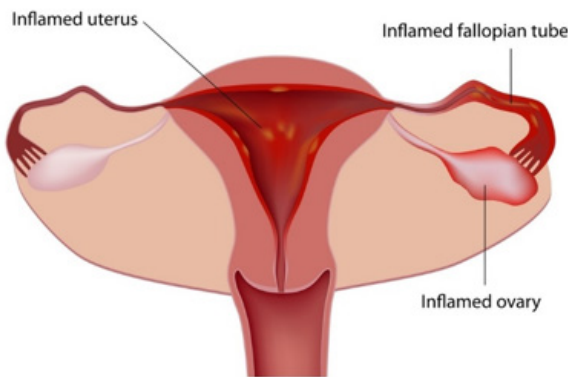
Material and Methods

The present cross-sectional study was conducted in J.N. Medical College and Hospital (J.N.M.C.H.), Aligarh Muslim University, Aligarh.The patients were selected from the Gynaecological OPDs of the Department of Obstetrics and Gynaecology, Rural and Urban Health Training Centres (R.H.T.C & U.H.T.C) of the Department of Community Medicine.The females selected for the study from the Gynaecology OPD of JNMCH were labelled as group I while those selected from UHTC and RHTC were labelled as group II and group III respectively.Permission for doing the study was taken by the Board of Studies in the Department of Community Medicine, Jawaharlal Nehru Medical College, Aligarh Muslim University, Aligarh.The study was carried out for a period of one year, *from 1st August 2001 to 31st July 2002*. The present study was carried out among evermarried females in the reproductive age group of 15 to 49 years.Women who gave positive history of PID, were asked to give their consent for the study. Their refusal, was taken as exclusion criteria. Females with PID who were menstruating or who had taken antibiotic within the previous month were also excluded from the study.

A total of 350 ever married females were selected from the Gynaecology OPD of J.N. Medical College Hospital (n=170),Urban Health Training Centre (n=100) and Rural Health Training Centre (n=80).

A detailed clinical history and clinical examination were recorded on a pre formed and pre tested proforma .All the females under study were subjected to per vaginal examination .The cervical discharge was collected by three different techniques for pathological and microbiological investigations.

Results

Table 1: Distribution of the study population according to social class and agency of delivery in last pregnancy(n=299)

Social class	Sweepress/untrained dais/relatives	Trained dais	Nurses	Doctors	Total
I	3(9.7)	1(3.2)	3(9.7)	24(77.4)	31(10.4)
II	20(38.5)	0(0.0)	4(7.7)	28(53.8)	52(17.4)
III	123(83.7)	0(0.0)	1(0.7)	23(15.6)	147(49.2)
IV	55(88.7)	1(1.6)	2(3.2)	4(6.5)	62(20.7)
V	7(100)	0(0.0)	0(0.0)	0(0.0)	7(2.3)
Total	208(69.6)	2(0.7)	10(3.3)	79(26.4)	299(100.0)

The figures in parenthesis show percentage

Z=10, p<0.001 (highly significant)

Table 2: Distribution of the study population according to social class and number of abortions(n=350)

Social class	Abortions		Total
	Present	Absent	
I	8(17.8)	37(82.2)	45(12.9)
II	16(19.5)	66(80.5)	82(23.4)
III	56(37.1)	95(62.9)	151(43.1)
IV	30(46.2)	35(53.8)	65(18.6)
V	3(42.9)	4(57.1)	7(2.0)
Total	113(32.3)	237(67.7)	350(100.0)

The figures in parenthesis show percentage

Z=3.9, p<0.001 (highly significant)

Table 3: Correlation of infertility with age in cases of PID (n=60)

Age group(years)	Infertility		Total
	Primary	Secondary	
15-19	0 (0.0)	0 (0.0)	0 (0.0)
20-24	3 (75.0)	1(25.0)	4(6.6)
25-29	32(86.5)	5(13.5)	37(61.7)
30-34	16(84.2)	3(15.8)	19(31.7)
35-39	0 (0.0)	0 (0.0)	0 (0.0)
40-44	0 (0.0)	0 (0.0)	0 (0.0)
45-49	0 (0.0)	0 (0.0)	0 (0.0)
Total	51(85.0)	9(15.0)	60(100.0)

The figures in parenthesis show percentage

Discussion

Out of 299 last deliveries of the females under study as shown in table 1, 79(26.4)were conducted by doctors,12(4.0)were conducted by trained dais or nurses and 208(69.6%)were conducted by sweepress/ untrained dais /relatives.Out of 299 deliveries.those conducted by doctors took place at hospitals(26.4%). While those conducted by sweepress/untrained dais/relatives/trained dais/nurses took place at home (73.6%).It is quite obvious from table 1 that deliveries conducted by sweepress/untrained dais/ relatives was given less importance in Social class I and II in comparision to Social class III to V and was found to be statistically significant (Z=10, p<0.001).

Thus unhygienic deliveries may give rise to more chances of pelvic infection.

A study [5]reported that delivery by doctor was given greater preference by those in social class I and II than those in III,IV and V.

Unhygienic delivery,post partum infection,unsafe obstetric and abortion procedures are observed to be linked to pelvic infection[3].

Table 2 shows that abortion rate is more in lower social classes(III-V).It may be due to more infection rate in lower social classes because of unawareness among the women regarding hygiene and health. The Z test for proportion was applied for testing the significance between the presence of more abortions in lower social classes(III-V) in comparison to upper social classes(I-II).The difference in the rate of abortions in lower(III-V) and upper(I -II) socio economic classes was found to be significant statistically*(Z=3.9, p<0.001).*

Another study[6] found that abortions were common in middle and lower social classes(82.8%) while 17.2%were reported in social class I and II.

Another study[7] reported a strong association between rates of pelvic infection and history of abortion.

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Garg [8] found in his study of urban slum area in New Delhi that history of abortion was significantly related to the symptom complexes of PID.

As shown **in Table 3**, there were 60 cases of infertility among 350 cases of PID (17.1%). The maximum cases of infertility were seen in the age group 25-29 years(37 cases).There were 51 cases presenting with primary infertility and 9 cases of secondary infertility.

A study [9]reported a higher incidence of 29.4% of infertility in association with PID.The maximum incidence was seen in 25-29 years age group, as in our study.

After one or more infections,15.2%of the women who exposed themselves to the risk of pregnancy were infertile because of tubal occlusions[10].

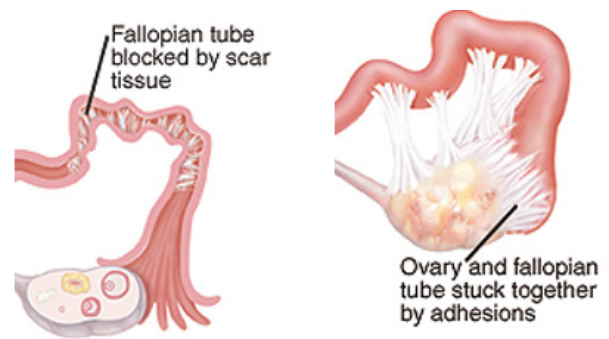Jejeebhoy et al[3] identified STDs to be a potential determinant of infertility.

Deshmukh et al[11]found PID to be the largest single factor causing tubal involvement in infertility.

Another study[12]reported maximum number of patients of primary infertility to be in the age group 21-25 years.

Infertility also increases dramatically with recurrent episodes of PID. Infertility occurred in 8% of patients with one episode, 20% of patients with two episodes, and 40% in those with three or more episodes of PID[2].

The prevalence of tubal factor causing infertility was found to be between 15% and 20% [13,14,15]. This increased prevalence of the tubal factor causing infertility can be attributed to the increased prevalence of PID and genital TB in the South Asian countries.

One study estimated that for females with PID between 20 to 24 years of age, 18% would eventually develop chronic pain, 8.5% would develop ectopic pregnancies, and 16.8% would struggle with infertility[16,17,18].

Fallopian tube blocked by scar tissue

Ovary and fallopian tube stuck together by adhesions

Conclusion

The major focus should be on patient education and preventing PID and sexually transmitted infections. Nurses and health workers should educate the patients about safe sex, the use of condoms, and reducing the number of sexual partners. Teenagers and adolescents should be asked to delay sexual activity until 16 or older. The doctor who prescribes the medicines should ask the patient to bring in the partner, who also needs to be assessed and treated for a sexually transmitted infection; otherwise, the cycle of infection will continue.

Damage to the female reproductive tract from PID is usually irreversible; therefore, prompt antibiotic treatment is necessary to prevent any scarring of the reproductive tract[19].Parenteral and oral antibiotic regimens have been found to have similar efficacy in women with mild to moderately severe PID[20,21]. Community health nursing has been found to be an effective risk reduction strategy in minority and low income adolescents [22, 23,24].

References

1. Eng TR,Butler WT,Washington DC.The hidden epidemic confronting sexually transmitted diseases. Committee on prevention and control of STDs.Institue of Medicine.National Academy press(1997).

2. WestromL,et al.Pelvic inflammatory disease and fertility.A cohort of 1844 women with laparoscopically verified disease and 657 control women with normal laparoscopic results.Sex .Transmitted Diseases (1992).19:185-92

3. Jejeebhoy ,Shireen J:Infertility in India -levels, patterns and consequences. Priorities for social science research. Journal of health welfare(1998),44(2):15-24.

4. Shafer MAB,Irwin CE ,Sweet RL.Acute salpingitis in the adolescent female.J of Paediatrics (1982),100:339.

5. Rasheed P:A study of the health status of expectant mothers in Aligarh city(UP).Thesis MD.(Preventive and Social Medicine).AMU,Aligarh ,1973.

6. Asif R:Pregnancy and its outcome in relation to high risk factors in JNMCH,AMU,Aligarh.Thesis MD(Community Medicine)1991.

7. Kochar M,:Etiology of pelvic infection treated by the gynecologic service of the Kasturba Hospital,Delhi,India.India .Am.J.Obstet.Gynecol. (1980),138-872.

8. Garg S,Meenakshi Singh MMC,Mehra H.:Perceived reproductive morbidity and health care seeking behaviour among women in an urban slum. Journal of National Institute of Health and Family Welfare(2001),24(4):178-186.

9. Singh M:Role of ultrasonography and laparoscopy as a diagnostic aid in the management of PID.Thesis MD(Obstet and Gynae). JNMCH, AMU,Aligarh (1990).

10. Westrom L:Incidence,prevalence and trends of acute pelvic inflammatory disease and its consequences in industrialized countries. Am.J. Obstet.Gynecol. (1980),138-880.

11. Deshmukh GA,Vijaykar IV, Singhal AE,Tilwani SP:Tubal factor in sterility -evaluation by laparoscopy.J.Obstet.Gynae.India(1986),36:898.

12. Khan Z.:Epidemiology of infertility in patients attending gynae OPDs at JNMCH,AMU,Aligarh. Thesis MD(Preventive and Social Medicine)1980.

13. Farhi J, BenHaroush A. Distribution of causes of infertility in patients attending primary fertility clinics in Israel. Isr Med Assoc J 2011;13:514. 9.

14. Masoumi SZ, Parsa P, Darvish N, Mokhtari S, Yavangi M, Roshanaei G. An epidemiologic survey on the causes of infertility in patients referred to infertility center in Fatemieh hospital in Hamadan. Iran J Reprod Med 2015;13:5136.

15. Elussein EA, Magid YM, Omer MM, Adam I. Clinical patterns and major causes of infertility among Sudanese couples. Trop Doct 2008;38:2434

16. Colombel JF, Shin A, Gibson PR. AGA Clinical Practice Update on Functional Gastrointestinal Symptoms in Patients With Inflammatory Bowel Disease: Expert Review. Clin Gastroenterol Hepatol. 2019 Feb;17(3):380-390.e1. [PMC free article] [PubMed]

17. Witkin SS, Minis E, Athanasiou A, Leizer J, Linhares IM. Chlamydia trachomatis: the Persistent Pathogen. Clin Vaccine Immunol. 2017 Oct;24(10) [PMC free article] [PubMed]

18. Park ST, Lee SW, Kim MJ, Kang YM, Moon HM, Rhim CC. Clinical characteristics of genital chlamydia infection in pelvic inflammatory disease. BMC Womens Health. 2017 Jan 13;17(1):5. [PMC free article] [PubMed]

19. CDC. Pelvic Inflammatory Disease (PID) Treatment and Care. Atlanta, GA: Department of Health and Human Services; 2015.

20. Ness RB, Soper DE, Holley RL, et al. Effectiveness of inpatient and outpatient treatment strategies for women with pelvic inflammatory disease: results from the pelvic inflammatory disease evaluation and clinical health (PEACH) randomized trial. Am J Obstet Gynecol. 2002; 186(5):929–937.

21. Ness RB, Trautmann G, Richter HE, et al. Effectiveness of treatment strategies of some women with pelvic inflammatory disease: a randomized trial. Obstet Gynecol. 2005;106(3):573–580

22. Nguyen JD, Carson ML, Parris KM, Place P. A comparison pilot study of public health field nursing home visitation program interventions for pregnant Hispanic adolescents. Public Health Nurs. 2003;20(5):412–418.

23. Koniak-griffin D, Mathenge C, Anderson NL, Verzemnieks I. An early intervention program for adolescent mothers: a nursing demonstration project. J Obstet Gynecol Neonatal Nurs. 1999;28(1):51–59.

24. Kitzman H, Olds DL, Henderson CR, et al. Effect of prenatal and infancy home visitation by nurses on pregnancy outcomes, childhood injuries, and repeated childbearing. A randomized controlled trial. JAMA. 1997;278(8):644–652.

Predisposing Factors of Diabetic Foot Amputation among the Diabetic Patients in a Tertiary Care Hospital

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Abstract

Background and Aim: Diabetic patients have a 15 to 20 time's higher risk of amputation than non-diabetic patients. In literature, many factors have been mentioned which affect diabetic foot prevalence and its treatment among diabetic patients. Present study was directed to recognize those factors. Identification of those factors would help to bring down the financial burden over patients and healthcare centers.

Material and Methods: Present cross-sectional study was conducted among the diabetic (diabetes type II) patients who came with problems relevant with diabetic foot in the surgical outpatient department of tertiary care institute of India for the duration of 6 months. Three hundred Patients were categorized into two categories based on the treatment advised to them. One category of patients was treated through amputation whereas, other category of patients was treated with antibiotics and wound dressings. A self-structured questionnaire was built to collect the required data from patients. Chi-square was applied to identify any association.

Results: From the total of 300 patients 78 (26%) were advised amputation, whereas, 22 (74%) patients were managed conservatively. The correlation between diabetic foot amputation and various factors which included gender, socioeconomic status, diet modification, blood sugar monitoring, life style, therapy type, smoking (p=0.02), ischemic heart disease, peripheral neuropathy and peripheral arterial disease (p=0.001) was statistically significant.

Conclusion: The incidence of foot amputation was high among the patients who had male gender, lower educational status, lower socioeconomic status, longer duration of diabetes, no diet change, no proper blood sugar monitoring, sedentary type of life style, inadequate therapy, poor compliance with treatment, history of smoking, hypertension, ischemic heart disease, stroke, peripheral neuropathy, and peripheral arterial disease and these factors were correlated with incidence of diabetic foot amputation significantly except duration of diabetes.

Key Words: Cross-sectional study, Diabetic foot amputation, Peripheral neuropathy, Socioeconomic status

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Introduction

The prevalence of diabetes for all age-groups worldwide is estimated to be 2.8% in 2000 and which is likely to rise to 4.4% by the year 2030. The total number of persons affected by diabetes is also projected to rise from 171 million in 2000 to 366 million by 2030.[1] Approximately 20% of all diabetics who enter the hospital are admitted for the foot problems.[2] The most common components in the causal pathway leading to limbloss include peripheral neuropathy, ulceration, infection, and peripheral vascular disease. Annual incidence of foot ulcers is 1% to 4% and prevalence 5% to 10% in patients with diabetes [3]

Diabetes mellitus has multiple chronic complications. These complications impact almost every system of human body. There are two types of complications including microvascular complications and macrovascular complications. Microvascular complication included retinopathy, nephropathy and neuropathy, whereas, macrovascular complications involved ischemic heart disease, cerebrovascular disease, and peripheral arterial disease.[4,5] Along with these aforementioned complications, one of the very lethal complications of diabetes mellitus is diabetic foot. Diabetic foot indicates an area of necrosis and gangrene distal to ankle joint.[6] The causative agents for diabetic food consisted of peripheral neuropathy, peripheral arterial disease, and infection.[7] Approximately 90% of non-traumatic lower limb amputations which is caused by diabetic foot only and thus it also leaves people physically paralyzed as well.[8,9,10]

Diabetic foot ulcers and amputation are acute health and socioeconomic problems that negatively affect the quality of life of patients and impose a high economic burden on the patients and society.[11] Of patients with foot ulcers, 20% to 50% eventually undergo amputation.[12-14] Diabetic patients have a 15 to 20 times higher risk of amputation than non-diabetic patients.[15,16] Amputation is a multifactorial complication in diabetic patients. Older age, being male, and the duration of disease have been reported to be risk factors for amputation. In various studies, the incidence of amputation in diabetic patients has been reported to range from 5.2% to 39.4%.[18,19] People with diabetic foot get managed, either in conservative manner via wound dressing and antibiotics, or through amputation of affected foot.[20] In literature, many factors have been mentioned which affect diabetic foot prevalence and its treatment among diabetic patients. These factors included gender, educational status, socioeconomic status, duration of diabetes, diet modification, blood sugar monitoring, life style, type of therapy, compliance with treatment, smoking, hypertension, ischemic heart disease, stroke, peripheral arterial disease, and peripheral neuropathy[21-23]. Present study was directed to recognize those factors. Identification of those factors would help to bring down the financial burden over patients and healthcare centers.

Material and Methods

Present cross-sectional study was conducted among the diabetic (diabetes type II) patients who came with problems relevant with diabetic foot in the surgical outpatient department of tertiary care institute of India for the duration of 6 months. Study sample size was calculated through WHO sample size calculator and it was 300 with confidence interval of 95%. Only those patients who were willing to participate and who had no trauma history were recruited while patients who had history of any trauma and were not willing to participate were excluded from study. . Patients were categorized into two categories based on the treatment advised to them. One category of patients was treated through amputation whereas, other category of patients was treated with antibiotics and wound dressings. A self-structured questionnaire was built to collect the required data from patients. Questionnaire had two components. First was related to the demographic information of the participants. In second part of questionnaire, data regarding the duration of diabetes, diet modification according to diabetes chart, life style, type of therapy for diabetes, compliance with therapy, daily blood sugar monitoring, smoking history, hypertension, stroke history, and ischemic heart disease history was collected. Physical examination was also performed of each patient to check for peripheral neuropathy and peripheral arterial disease. Patients were considered to have to peripheral neuropathy, if the vibration sensation was reduced or absent in the foot and it was assessed by

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a tuning fork of 252 Hz, while patients with absent pulses of posterior tibialis and dorsalis pedis in lower limbs were considered to have peripheral arterial disease.

Statistical analysis

The recorded data was compiled and entered in a spreadsheet computer program (Microsoft Excel 2007) and then exported to data editor page of SPSS version 15 (SPSS Inc., Chicago, Illinois, USA). For all tests, confidence level and level of significance were set at 95% and 5% respectively.

Results

Out of 300 participants 180 (60%) were males while 120 (40%) were females. The means of age and duration of diabetes for study population were 58.10 years with SD of ±10.20 years and 13.22 years with SD of ±6.90 years respectively. The percentage of patients who had been advised amputation of foot was 26%, whereas, patients who had been advised conservative treatment for diabetic foot were 74%.

In comparison to non-amputation group of patients, the amputation group of patients had more patients with male gender, lower educational status, lower socioeconomic status, longer duration of diabetes, no diet modification, no blood sugar monitoring, sedentary life style, oral hypoglycemic agent as therapy of choice for diabetes, poor treatment compliance, history of smoking, and peripheral arterial disease.

Table 1: Association of study variables with diabetic foot amputation

Variable	N=300	Number Percentage (%)	Diabetic patients' groups N (%)		P value
			Amputation N (%)	Non-amputation N (%)	
Gender			78 (26)	222 (74)	
	Male	180 (60)	55 (70.51)	120 (54.05)	
	Female	120 (40)	23 (29.48)	102 (45.94)	0.002*
Socioeconomic status	Lower class	170 (56.6)	58 (74.35)	106 (47.74)	0.001*
	Middle class	130 (43.3)	14 (17.94)	116 (52.25)	
Duration of diabetes	Longer	168 (56)	42 (53.84)	125 (56.30)	
	Shorter	132 (44)	36 (46.15)	97 (43.69)	0.09
Diet modification	Yes	125 (41.66)	25 (32.05)	95 (42.79)	
	No	175 (58.33)	53 (67.94)	127 (57.20)	0.05*
Blood sugar monitoring	Yes	60 (20)	22 (28.20)	40 (18.01)	
	No	240 (80)	56 (71.79)	182 (81.98)	0.0006*
Life style	Active	90 (30)	18 (23.07)	70 (31.53)	0.001*
	Sedentary	210 (70)	60 (76.92)	152 (68.4)	
	Insulin	70 (23.3)	20 (25.64)	50 (22.52)	0.003*
	Oral hypoglycemic agent	200 (66.6)	42 (53.84)	160 (72.07)	
Type of therapy	Both	30 (10)	16 (20.51)	12 (5.4)	

* indicates statistically significance at p≤0.05

Discussion

Diabetes could be very devastating when its complications occur. It has multiple and deadly

complications that involve every major system of the body. Along with aforementioned complications it could lead to a very destructive change among the diabetic patients with poor diabetes control in the form of diabetic foot. Inappropriate care of diabetic foot can bring further problems in the life of diabetic patients when poor diabetic foot care leads to its amputation. It all shows that how deadly diabetes could be when it goes beyond proper control. The diabetic foot could be managed conservatively with proper wound dressing and antibiotics. But when the tissues of diabetic foot get infected and necrosed then only option we left with is foot amputation.[19] The incidence of the diabetic foot amputation among the diabetic population of our study was high 26%. Little lower incidence (22.50%) of diabetic foot amputation has been noted in a study that was also conducted among Pakistani population.[19] In a study at China 21.50% amputation has been noted as well.[20]

Almost all factors that are related to diabetes management including diet modification, blood sugar monitoring, life style, type of therapy, and compliance with therapy were associated with amputation of diabetic foot significantly except the duration of diabetes. No change in diet, irregular blood sugar monitoring, sedentary life style, oral hypoglycemic agents, and poor compliance were associated with higher incidence of diabetic foot amputation. Similar findings have been noted in other studies that were conducted in various countries.[19,21-25] Stone et al [26] the duration from the time of diagnosis until the first event of amputation was 11 years. In the study by Armstrong et al the duration was 14 years, and by Muller et al, it was 8 years and in present study, it was 7 years. In our study, mean duration of diabetes mellitus is less than the other studies may be because our patients had lack of knowledge regarding the diabetes control and foot care.

We observed that history of comorbidities which comprised of smoking; hypertension, ischemic heart disease, and stroke were strongly involved in the rise of foot amputation incidence among diabetic patients. Relationship between smoking and diabetic foot amputation has also been noted in a study of China.[27] Likewise, the association between cardiovascular system related diseases hypertension and ischemic heart disease and amputation of diabetic foot, is also established in literature.[19,28]

Diabetic complications including peripheral neuropathy and peripheral arterial disease that occur in the advance stage of the diabetes were also noted as factors that predispose to the foot amputation to the diabetic patients with diabetic foot. Amputation incidence could be higher among diabetic patients with peripheral vascular disease, as this disease brings obstruction in the flow of the blood to the peripheries which lead to gangrenous changes in the limbs and consequently amputation of limbs becomes the only treatment for diabetic foot. Moulik et al had reported the incidence of peripheral neuropathy in as much as 61% of diabetic patients. In a study by Boyko and associates, 60% of the patients who developed diabetic foot ulcer had neuropathy. Pecoraro and colleagues indicated that peripheral vascular disease and infection were significantly associated with an increased prevalence of lower-extremity amputation. Additionally, infection, gangrene, and ischemia were the most common component causes of lower-extremity amputation.[29,30]

Conclusion

The incidence of foot amputation was high among the patients who had male gender, lower educational status, lower socioeconomic status, longer duration of diabetes, no diet change, no proper blood sugar monitoring, sedentary type of life style, inadequate therapy, poor compliance with treatment, history of smoking, hypertension, ischemic heart disease, stroke, peripheral neuropathy, and peripheral arterial disease and these factors were correlated with incidence of diabetic foot amputation significantly except duration of diabetes. So, by controlling the controllable factors we could prevent the foot amputation among diabetic patients. Raising awareness about the lethal complications of diabetic foot and educating the patient regarding the foot hygiene, use of well fitted closed foot wear, early access to healthcare system and satisfactory rehabilitation might help in reducing the risk of amputations.

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Ethical approval was taken form institutional ethical committed

References

1. Shojaiefard A, Khorgami Z, Larijani B. Independent risk factors for amputation in diabetic foot. Int J Diabetes Dev Ctries 2008;28:32-37.

2. Yesil S, Akinci B, Yener S, Bayraktar F, Karabay O, Havitcioglu H, et al. Predictors of amputation in diabetics with foot ulcer: single center experience in a large Turkish cohort. Hormones (Athens) 2009;8: 286-295.

3. Lantion-Ang LC. Epidemiology of diabetes mellitus in Western pacific region: focus on Philippines. Diabetes Res Clin Pract 2000;50 Suppl 2:S29-S34.

4. Sun B, Luo Z, Zhou J. Comprehensive elaboration of glycemic variability in diabetic macrovascular and microvascular complications. Cardiovasc Diabetol. 2021;20(1):9.

5. Zhao H, Shu L, Huang W, Wang W, Song G. Difference Analysis Of Related Factors In Macrovascular And Microvascular Complications In Chinese Patients With Type 2 Diabetes Mellitus: A Case-Control Study Protocol. Diabetes Metab Syndr Obes. 2019;12:2193-200.

6. Schaper NC, Andros G, Apelqvist J, Bakker K, Lammer J, Lepantalo M, et al. Specific guidelines for the diagnosis and treatment of peripheral arterial disease in a patient with diabetes and ulceration of the foot 2011. Diabetes Metab Res Rev. 2012;28(1):236- 7.

7. Boulton AJ. The pathway to foot ulceration in diabetes. Med Clin North Am. 2013;97(5):775-90.

8. Nanwani B, Shankar P, Kumar R, Shaukat F. Risk Factors of Diabetic Foot Amputation in Pakistani Type II Diabetes Individuals. Cureus. 2019;11(6):4795.

9. Centers for Disease Control and Prevention. National diabetes fact sheet: national estimates and general information on diabetes and prediabetes in the United States, 2011 [cited 2019 March 11]. Available from: http://www.familydocs.org/f/CDC%20Diabetes%20 fact%20 sheet-2011.pdf.

10. Pscherer S, Dippel FW, Lauterbach S, Kostev K. Amputation rate and risk factors in type 2 patients with diabetic foot syndrome under real-life conditions in Germany. Prim Care Diabetes 2012;6:241-246.

11. Ragnarson Tennvall G, Apelqvist J. Prevention of diabetes-related foot ulcers and amputations: a cost-utility analysis based on Markov model simulations.

Diabetologia 2001;44:2077-2087.

12. Ashraf MN, Khalil-ur-Rehman, Malik KI, Iqbal GS. Epidemiology and outcome in patients of diabetic foot. J Ayub Med Coll Abbottabad 2011;23:122-124.

13. Calle-Pascual AL, Redondo MJ, Ballesteros M, Martinez-Salinas MA, Diaz JA, De Matias P, et al. Nontraumatic lower extremity amputations in diabetic and non-diabetic subjects in Madrid, Spain. Diabetes Metab 1997;23:519-523.

14. Sämann A, Tajiyeva O, Müller N, Tschauner T, Hoyer H, Wolf G, et al. Prevalence of the diabetic foot syndrome at the primary care level in Germany: a cross-sectional study. Diabet Med 2008;25:557-563.

15. Crawford F, McCowan C, Dimitrov BD, Woodburn J, Wylie GH, Booth E, et al. The risk of foot ulceration in people with diabetes screened in community settings: findings from a cohort study. QJM 2011;104:403-410.

16. Bild DE, Selby JV, Sinnock P, Browner WS, Braveman P, Showstack JA. Lower-extremity amputation in people with diabetes. Epidemiology and prevention. Diabetes Care 1989;12:24-31.

17. Pscherer S, Dippel FW, Lauterbach S, Kostev K. Amputation rate and risk factors in type 2 patients with diabetic foot syndrome under real-life conditions in Germany. Prim Care Diabetes 2012;6:241-246.

18. Ashraf MN, Khalil-ur-Rehman, Malik KI, Iqbal GS. Epidemiology and outcome in patients of diabetic foot. J Ayub Med Coll Abbottabad 2011;23:122-124.

19. Nanwani B, Shankar P, Kumar R, Shaukat F. Risk Factors of Diabetic Foot Amputation in Pakistani Type II Diabetes Individuals. Cureus. 2019;11(6):4795.

20. Tanharo D, Ghods R, Pourrahimi M, Abdi M, Aghaei S, Vali N. Adherence to treatment in diabetic patients and its affecting factors. Pajouhan Scientific Journal. 2018;17(1):37-44.

21. Ahmed SA, Badi S, Tahir H, Ahmed MH, Almobarak AO. Knowledge and practice of diabetic foot care in Sudan: A cross sectional survey. Diabetes Metab Syndr. 2019;13(4):2431-5. 22. Madmoli M, Madmoli Y, Khodadadi M, Samsamipour M. Study of Some Effective Treatments for Accelerating Diabetic Foot Ulcer Healing: A Systematic Review. International Journal of Research Studies in Science, Engineering and Technology. 2019;6(2):34-9.

22. Dinh T, Veves A. The influence of gender as a risk factor in diabetic foot ulceration. Wounds. 2008;20(5):127-31.

23. Li X, Xiao T, Wang Y, Gu H, Liu Z, Jiang Y, et al.

Incidence, risk factors for amputation among patients with diabetic foot ulcer in a Chinese tertiary hospital. Diabetes Res Clin Pract. 2011;93(1):26-30.

24. Bansal D, Gudala K, Muthyala H, Esam HP, Nayakallu R, Bhansali A. Prevalence and risk factors of development of peripheral diabetic neuropathy in type 2 diabetes mellitus in a tertiary care setting. J Diabetes Investig. 2014;5(6):714-21.

25. Stone H H, MartinJ D. Synergistic necrotising cellulitis. Ann Surg. 1972; 175; 702 – 711.

26. Liu M, Zhang W, Yan Z, Yuan X. Smoking increases the risk of diabetic foot amputation: A meta-analysis.

Exp Ther Med. 2018;15(2):1680-5.

27. Young BA, Lin E, Von KM, Simon G, Ciechanowski P, Ludman EJ, et al. Diabetes complications severity index and risk of mortality, hospitalization, and healthcare utilization. Am J Manag Care. 2008;14(1):15-23.

28. Yammine K, Hayek F, Assi C. A meta-analysis of mortality after minor amputation among patients with diabetes and/or peripheral vascular disease. J Vasc Surg. 2020;72(6):2197-207.

29. Sadriwala QS, Gedam BS, Akhtar MA. Risk factors of amputation in diabetic foot infections. Int Surg J. 2018;5(4):1399-402.

Stress among Post Graduate Trainee Doctors of a Tertiary Care Hospital - How Resilience does affect them?

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Abstract

Background: Stress is a condition appraised by persons as exceeding their resources and resilience is the ability to bounce back and perhaps even grow in the face of adverse life experiences. High stress levels are common among physicians. As a Post graduate trainee doctor (PGT) there are additional pressures of studies and thesis work.

Objective: To assess extent of stress and resilience among PGT doctors of a tertiary care hospital and Medical College.

Materials and Methods: It was a cross sectional time bound study of one year among 170 PGT doctors of various clinical departments. 126 PGTs were included as sample population after informed consent. After recording socio demographic variables with semi-structured proforma, Kessler psychological distress scale questionnaire (K10 scale), Wagnild and Young's Resilience Scale (WYR scale/ RS) were administered to each participant to assess stress and resilience respectively, which were finally analyzed with SPSS 20.

Results and Discussion: 33.3% PGTs were stressed-out and 30.9% PGTs had low resilience, having a negative correlation. Maximum stress was found among PGTs of Anesthesia department and highest Resilience was seen among Radio diagnosis PGTs. Stress was higher among female than male. Stress was highest among married PGT and resilience was highest among PGT who were in a relationship. Stress was highest among 3rd -year PGTs and resilience was highest among 2nd- year PGTs.

Conclusion: One third of PGTs were stressed and with low resilience. Females and those of Anesthesia department were more vulnerable. Being in relationship, but yet to be married enhance the resilience.

Keywords: Stress, Post Graduate Trainee Doctors, Resilience

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Introduction

Stress is a particular relationship between the person and the environment that is appraised by the person as exceeding their resources and endangering their wellbeing. [1] As a Post graduate trainee doctor (PGT) there are pressures of authorities regarding duties, studies and thesis work. Job dissatisfaction, parental expectations, worries of the future, interference of family life, constant interruption of leisure time, overburdened patient load, and risk of acquiring various nosocomial infections put them under lot of stress. [2-3] Chronic stress can affect mental and physical health. It may lead to musculoskeletal disorders, high blood pressure; disturbed metabolism associated with the risk for type 2 diabetes mellitus and cardiovascular problem [4].

Resilience refers to the capacity of a dynamic system to adapt successfully to disturbances that threatens the viability, function, development of the system. So higher resilience helps in better coping to adverse situations, combating against stresses [5] and finally ensures psychological wellbeing. [6] So enhancement of resilience may be an important target of treatment in anxiety, depression, and stress reactions. Resilience can be looked upon as a trait which can be developed through life experiences and various educational programs.[7] Loving and supportive environment, attentive and responsible parenting, positive relationships with other adults and peers, avoiding repeated exposure to uncontrollable stress and trauma, and preventing children in early entry to adulthood may bring higher resilience in children when they grow up into an adult. They become optimistic, playful, positive thinker, self-confident, and humorous. They acquire better risk facing ability, strong social skill, high coping, higher cognitive functioning and stronger ability for emotional regulation in stressful conditions [8-10].

Many studies have been done to measure stress, coping, psychological resilience among doctors, nurses and other health care personnel in different countries. [11-17] But there are many additional factors of stress among PGT doctors. Few Indian studies have been done on perceived stress among resident doctors, but the extent of resilience was not looked into. [18-21] So, the present study was conceptualized to assess the extent of stress and resilience among PGTs. Various socio demographic determinants were looked into as modifying factors of stress and resilience among PGTs.

Materials and Methods

Study setting and Participants

The participants of this study were recruited from Burdwan Medical College and Hospital, West Bengal. It was a time bound cross-sectional study of 1 year and was approved by the Institute Ethics Committee. PGT doctors of various clinical subjects whoever gave valid and informed consent were included.170 PGTs were posted in various clinical departments at that time. All of them had been approached. Those, who were available in their respective department in the stipulated time period of data collection, willing to participate and gave valid, informed consent were taken up as sample. Thus126 PGTs were included as sample population. Three study tools were administered to each participant. Appropriate statistical software (SPSS 20) was used to analyze the results.

The study tools were as follows

Semi structured socio-demographic proforma -

A specially designed semi structured socio demographic proforma was formulated using 11 parameter such as Age, Background, Training-specialty, Religion, Address, Language, Income, Relationship, Gender, Family and Year of Post Graduate Training.

Kessler Psychological Distress Scale (K10)[22] - It is used to measure stress or psychological distress which has been felt over last 1 month. It has 10 items and each item has 5 responses. Then each response is converted to 5-point Likert scale. Score-ranges from 10-50. Score<20well (without any stress), Score 20-24 mild mental disorder (Mild stress), Score 25-29 moderate mental disorder (Moderate stress), Score 30 and above severe mental disorder (severe stress).

Wagnild and Young's Resilience Scale (RS) [23]: This scale has 25 items. Respondent were asked to state the degree to which they agreed or disagreed with each item. All items are scored on a 7-point scale

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from 1, disagree to7, agree. Possible score ranges from 25 to 175 with higher scores reflecting higher resilience.

Total score has been divided as 6 levels [24]

1. Very low score 25-100
2. Low score 101-115
3. Moderately low 116-130
4. Moderate 131-145
5. Moderately high 146-160
6. Very high 161-175

Statistical Analysis

Descriptive analyses were computed in terms of mean and standard deviation for continuous variables and frequency with percentage for ordinal and nominal variables. Student's unpaired t test was performed to find comparison and level of significance between two variables and ANOVA was performed to find comparison and level of significance between more than two variables with continuous data. Chi square test was performed to find comparison and level of significance between two or more than two variables, when the data is categorical. Correlations between the variables were assessed using Pearson's test. Pearson's correlation coefficient of +1 indicate perfect positive correlation (both values rise together) whereas correlation coefficient -1 indicate perfect negative correlation (When one value rises, the other value decreases). All tests were 2 tailed and p value less than 0.05 was considered statistically significant (95% confidence interval).

Results

126 Post graduate trainees from various clinical departments at hospital took participation in the study. Mean age of this study population was 28.73 years.

Table 1. Extent of stress and resilience among PGT

Variable		Frequency (N=126) (%)
Kessler psychological Distress scale(K10)	Well (<20)	84 (66.7%)
	Mild (20-24)	30 (23.8%)
	Moderate (25-29)	9 (7.1%)
	Severe (30 or above)	3 (2.4%)
Wagnild Young Resilience Scale	Very low (25-100)	5 (4.0%)
	Low (101-115)	10 (7.9%)
	Moderately low (116-130)	24 (19.0%)
	Moderate (131-145)	63 (50.0%)
	Moderately high (146-160)	22 (17.5%)
	Very high (161-175)	2 (1.6%)

Table 1 shows 66.7% PGT had no stress. Rest 33.3% had mild(23.8%), moderate(7.1%), severe(2.4%) stress. Mean score of stress according to Kessler psychological distress scale (K10) was 18.63±4.41 (SD= 4.41). It also shows Mean score of resilience is 133.46±15.03 (SD=15.03). 30.9% showed low resilience and 19.1% showed high resilience, 50% having moderate resilience.
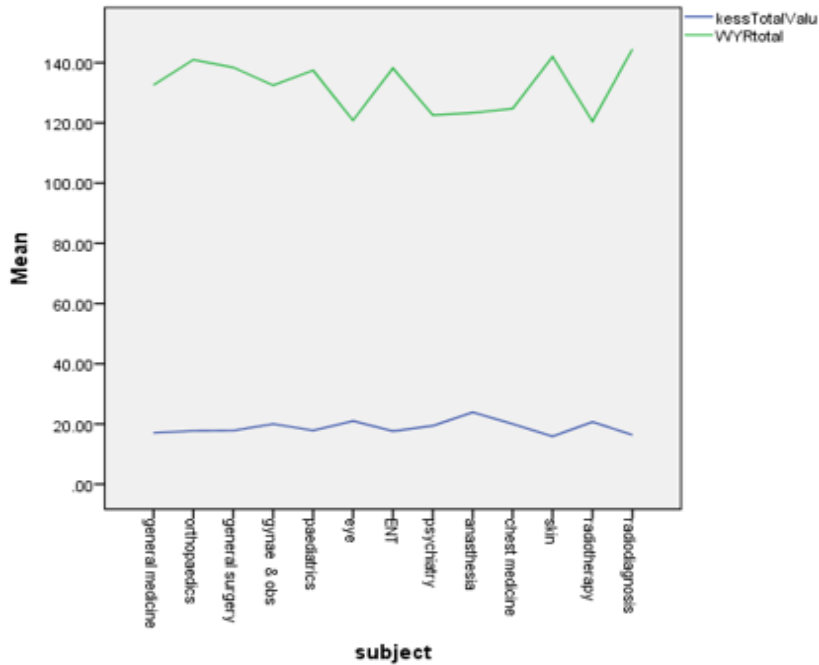
Figure 1 Extent of stress and resilience among PGTs of different clinical departments

Figure 1 shows various amount of stress and resilience were associated with different clinical subjects. Maximum stress was found among PGTs of Anesthesia, followed by Radiotherapy and Eye Department. Highest Resilience was seen among Radio diagnosis PGT, followed by Skin and Orthopedics Department. Stress was negatively correlated with Resilience for all the PGTs and the result was statistically significant.

Comparison of stress and resilience among various socio demographic variables were done using unpaired T test and ANOVA test. Only significant results are shown in table 2 and table 3

Table 2 Stress with gender, year of residency, relationship status

Variable		Stress (Kessler total value) Mean±SD	F(df)	P (Significance)
Gender	Male (N=84)	17.88±3.84	-2.76 (124)	**0.007 ***
	Female (N=42)	20.12±5.10		
Year of residency	1st year (N=41)	18.02±4.05	7.88 (2)	.001*
	2nd year (N=43)	17.21±3.46		
	3rd year (N=42)	20.67±4.93		
Relationship status	Married (N=46)	20.00±4.06	6.09 (2)	.003*
	In a releationship (N=57)	17.19±3.97		
	Single (N=23)	19.43±5.18		

Table 2 shows stress is significantly higher among female population than male (t= -2.76, p = .007). stress was significantly highest among 3rd year Post Graduate Trainee (PGT), followed by 1st year, and then 2nd year student. (F=7.88, p= .001). Stress was significantly highest among married, followed by single and lowest among PGTs who were in a relationship. (F=6.09,p=.003).

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Table 3 Resilience with gender, year of residency, relationship status

Variable		Resilience (Wagnild Young Resilience Scale Total)	F(df)	P (Significance)
Year of residency	1st year (N=41)	132.39±11.74	3.98 (2)	.021*
	2nd year (N=43)	138.33±14.48		
	3rd year (N=42)	129.52±17.26		
Relationship status	Married (N=46)	129.00±14.85	4.46 (2)	.014*
	In a relationship (N=57)	137.56±13.25		
	Single (N=23)	132.22±17.29		

Table 3 shows resilience was significantly highest among 2nd year PGT, followed by 1st year and then 3rd year PGT. (F=3.98, p= .021). Resilience was significantly highest among PGTs who are in a relationship, followed by single and then married (p=.014).

Among socio-demographic variables, age positively correlated with stress and negatively with resilience, but in neither case correlation reached significant level.

Discussion

In this study among 170 PGT of clinical subjects, 126 were assigned in the study (participation rate 74.12%). In a previous study at Nepal to assess stress and coping strategies among undergraduate medical students, overall response rate was 75.8% (407 out of 525 students).[11] In another previous study 1239 nurses were approached to measures resilience for the study and only 744 responded (overall response rate 60.05%).[15]

In this study only PGT Doctors from various clinical subjects (13 Department) were included. In a previous study at Delhi, PGT doctors from clinical subjects (19 departments) were included to measure stress among resident doctors.[18] In another study of Mumbai PGT doctors from all the departments of the hospital i.e. clinical and college i.e. pre and Para-clinical (18 departments) were included in the study to measure stress among resident doctors.[19]

Mean age of PGT doctors in this study was 28.73± 3.83 year, Mean age of PGT doctors at Delhi was found 27.5±2.3 yr. [18] In this study 66.7% male and 33.3% female PGT took participation. Sahasrabuddhe

AG et al found that 62% residents doctors were male, 37% were female.[19] A study found 57% male and 43% female among Canadian surgical residents. [13] Another study found 62.7% male, 37.3% female among medical students of Pakistan.[14] In this study 32.5% 1st year PGT, 34.1% 2nd year PGT, 33.3% 3rd year PGT took participation. In a previous study residents were evenly distributed in the three years of post-graduation, 34.07% residents were from first year, 32.60% from second year and 33.33% from third year. [19]

In this study, 66.7% PGT had no stress. Rest 33.3% had stress. Sahasrabuddhe AG et al found 37.3% doctors stressed [19] and Radman et al. found 46.3% medical students (under graduate) were stressed.[12] A study in Delhi found 32.8% resident doctors were stressed, 17.7% having mild stress, 12.2% having moderate stress, 2.9% having severe stress.[18] In our study 23.8% had mild stress, 7.1% had moderate stress, 2.4% had severe stress. In this study mean stress score was found 18.63±4.41 by K10 scale. In a previous study among medical students mean stress score was 19.61±6.76 by K10 scale. [12]

In this study mean score of resilience was found 133.46±15.03. Most of the PGT showed moderate resilience (50%) in the study, followed by low resilience (30.9%) and then followed by high resilience (19.1%). Losoi H et al. [24] found mean score of resilience 133.8±17.4 and Sull et all.[16] found mean score of resilience among health care worker in UK is 135.5±19.7. Mealer et al. found 22% ICU nurses were highly resilient.[15] These corroborated with the current study's finding. In this study male students were more resilient than female but the result were not statistically significant. Contrary to our finding a

study in Saudi Arabia found female dental students were more resilient than male. [17]

In this study maximum stress was found in Anesthesia Dept, followed by Radiotherapy, and Eye dept. This higher degree of stress within Anesthesia PGTs was perceived due to their frequent dealing of unexpected surgical emergencies and critical patients in CCU/HDU, frequent night duties leading to sleep deprivation, lack of recognition by patients. In a previous study in Mumbai it was found that Paediatrics, Gynaecology, Orthopaedics, Pathology department had high stress score. [19]

The present study shows stress was significantly higher among female population than male and this finding was corroborated with many other past finding.[14,23] This was perceived due to more recognition and preferential biasness of patients towards male doctors and females had to prove their potential in every aspect in a male prevalent fraternity. In an another study by Amr et al.[26] male and female medical students were similar on level of perceived stress, number of stressors, A study conducted by Das et al.[20] had concluded that gender as a factor does not influence the level of stress .

In this study stress was highest among 3rd yr PGT, followed by 1st year PGT and then 2nd yr. Third year PGTs had pressure of final thesis submission and pressure of studies due to their upcoming examinations. Saini NK et al. found highest stress among 1st yr , followed by 2nd yr and then 3rd yr PGT.[18] Sahashrabuddhe et al. also found highest stress among 1st yr PGT.[19] This can be explained by different course curriculum and different pressure of work distribution among PGT at different places.

In this study stress was highest among married PGT, followed by single and lowest among PGTs who were in a relationship. This was found due to a balancing problem between work and family. Few married PGTs were forced to stay away from their partners after their marriage. This brought unhappiness in their life. Sahasrabuddhe AG et al found no association between marital status and stress. [19] Stress levels were more in married residents than as compared to unmarried in a study by Gobbur et al. [21] In another study in India by Guruprakash

et al.[27] did not show any significant association between marital status and stress level among post graduate medical students.

In our study stress was negatively correlated with resilience, that means resilience acts as a protective factor to combat stress. Similar to our findings Kiziela A et al. also found that workload distress is inversely dependent on resilience.[28]

 In this study, though not statistically significant, stress increases with age while resilience decreases. This can be explained as the aged PGTs felt additional pressure of family burden than the younger PGTs during the same residency period. This finding however did not match with one previous Malaysia study, where higher stress level was found among younger age group of medical students.[12]

Conclusion

In this study 33.3% PGT were stressed-out of them 23.8% mild, 7.1% moderate, 2.4% having severe stress. Moderate resilience was found among 50% PGT, low resilience was found among 30.9% PGT and 19.1% PGT had high resilience. Maximum stress was found among PGTs of Anesthesia, followed by Radiotherapy and Eye Department. Highest Resilience was seen among Radio diagnosis PGT, followed by Skin and Orthopedics Department. Stress was higher among female than male. Stress was highest among married PGT and resilience was highest among PGT who were in a relationship. Stress was highest among 3rd yr PGTs and resilience was highest among 2nd yr PGT. Stress was negatively co related with resilience.

Limitation:

Para clinical, nonclinical disciplines were not included. There were various other factors modifying stress, resilience, which were not included. Differential impact of the individual determinants was not assessed.

Conflicts Of Interest: There were no conflicts of interest

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References

1. Lazarus RS and Folkman, S. Stress, appraisal, and coping. Springer publishing company,1984, p.31

2. Cohen JS and Patten S. Wellbeing in residency training: a survey examining resident physicians' satisfaction both within and outside of residency training and mental health in Alberta. BMC Med Edu 2005; 22: 5- 21.

3. Houtman I, Jettinghoff K, Cedillo L. Raising awareness of stress at work in developing countries: A modern hazard in a traditional working environment: The role of an employers and /or worker representatives . Protecting Workers' Health Series No. 6. World Health Organization 2007.

4. Gentile JP And Roman B. Medical Student Mental Health Services: Psychiatrists Treating Medical Students. Psychiatry (Edgemont) 2009; 6(5): 38–45.

5. Edmonstone J. Personal resilience for healthcare staff, when the going gets tough. London: Radcliffe Publishing Ltd. 2013.

6. Sergeant J and Laws-Chapman C. Creating a positive workplace culture. Nursing Mangement 2012; 18(9):14-19.

7. Eley DS, Cloninger CR, Walters L, Laurence C, Synnott R, and Wilkinson D. The relationship between resilience and personality traits in doctors: implications for enhancing well being. PeerJ 2013; 1:e216

8. Burt KB, Paysnick AA. Resilience in the transition to adulthood. Dev Psychopathology 2012; 24(2): 493-505.

9. Sapienza JK, Masten AS. Understanding and promoting resilience in children and youth.Curr.Opin. Psychiatry 2011; 24: 267-273.

10. Wu G, Feder A, Cohen H, Kim J, Calderon S, Charney DS, and Mathé AA. Understanding resiliencc. Front Behav Neuros 2013; 7: 10.

11. Sreeramareddy CT, Shankar PR, Binu VS, Mukhopadhyay C, Ray B. and Menezes RG. Psychological morbidity, sources of stress and coping strategies among undergraduate medical students of Nepal . BMC Med Edu 2007; 7: 26.

12. Radman, SA, Ahmed R, Ahmed M, Rampal KG. Stress and Coping Strategies of Students in a Medical Faculty in Malaysia. Malaysian J Med Sci 2011; 18(3): 57-64

13. Aminazadeh N, Farrokhyar F, Naeeni A, Naeeni M, Reid S, Kashfi A, Kahnamoui K. Is Canadian surgical residency training stressful? Can J Surg 2012; 55(4 Suppl. 2): S145-S51.

14. Qamar K, Khiani MRB, Ayyub A, Khan AA et al. Higher stress scores for female medical students measured by the Kessler Psychological Distress Scale (K10) in Pakistan. J Educ Eval Health Prof 2014; 11: 27.

15. Mealer M, Jones J, Newman J, McFann KK, Rothbaum B and Moss M. The presence of resilience is associated with a healthier psychological profile in ICU nurses: Results of a national survey. Int J Nurs Stud 2012; 49(3): 292–99.

16. Sull A, Harland N and Moore A. Resilience of health-care workers in the UK; a cross-sectional survey. J Occup Med Toxicol 2015; 10:20

17. Aboalshamat KT, Alsiyud AO, AL-Sayed RA, Alreddadi RS, Faqiehi SS, Almehmadi SA.The relationship between resilience, happiness, and the life satisfaction in dental and medical students in Jeddah, Saudi Arabia. Niger J Clin Pract 2018;21:1038-43

18. Saini NK, Agarwal S, Bhasin SK et al. Prevalence of stress among resident doctors working in Medical Colleges of Delhi. Indian J Public Health 2010; 54(4): 219-23.

19. Sahasrabuddhe AG, Suryawanshi SR, Bhandari S. Stress among doctors doing residency: a cross-sectional study at a tertiary care hospital in the city of Mumbai. Natl. J. Community Med 2015; 6(1): 21-4.

20. Das P, Sahoo R. Stress and depression among post graduate students. Int J Sci Res Public 2012;2:1-5.

21. Gobbur SB, Nigudgi SR, Reddy S. Prevalence of stress among post graduate doctors at Mahadevappa Rampure Medical College Kalaburagi, Karnataka. Int J Community Med Public Health 2016;3:576-80.

22. Kessler RC, Andrews G, Colpe LJ, Hiripi E, Mroczek DK, Normand S-LT, Walters EE, Zaslavsky AM. Short screening scales to monitor population prevalences and trends in non-specific psychological distress. Psychological Medicine 2002; 32: 959-76.

23. Wagnild G and Young HM. Resilience among older women. Image. Journal of Nursing Scholarship 1990; 22: 252-55.

24. Losoi H, Turunen S, Waljas M, Helminen M, Öhman J, Julkunen J, Rosti-Otajärvi E. Psychometric Properties of the Finnish Version of the Resilience Scale and its Short Version. Psychology, Community & Health 2013; 2(1): 1–10.

25. Bore M, Kelly B, Nair B. Potential predictors of psychological distress and well-being in medical students: a cross-sectional pilot study. Advances in Medical Education and Practice 2016; 7: 125–35.

26. Amr M, Hady El Gilany A, El-Hawary A. Does gender predict medical students' stress in Mansoura, Egypt? Med Educ Online 2008;13:12.

27. Guruprakash KV, Mehta SG, Atul B, Prakash J, Divinakumar KJ, Khan SA, Patra P. A study of relationship between perceived stress, coping pattern, burnout, and general psychopathology among the postgraduate medical students. Ind Psychiatry Journal 2018;27:141-6.

28. Kiziela A, Viliūnienė R, Friborg O, Navickas A. Distress and resilience associated with workloads of medical students. J Ment Health 2019;28:319-323

Eschar as a Sensitive Marker for Scrub Typhus Diagnosis at the Primary Healthcare Level

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Abstract

Background and aim of study: Scrub typhus, a potentially fatal rickettsial disease, is reported from many Indian states, but mostly from tertiary care centers. This study is distinct as it was undertaken in a primary care center in a rural area. Aim was to observe the age, gender and occupational profile of patients diagnosed with scrub typhus at our center during the period from January 2017-19; to find out about the site and day of appearance of eschar with respect to duration of fever and to note the clinical features and complications of scrub typhus.

Methods: Study sample consisted of patients presenting with fever who developed an eschar and positive serology for Ig M on the 10th day.

Conclusion: A total of 31cases were seen, of which four were children and eighteen were adult females. The "eschar" was picked up within 5 days of onset of fever in 26(84%) cases. There was no mortality. This study is unique also in the large size of the cases from a rural center and short latency to effective treatment. The study emphasizes the necessity of picking up the eschar by detailed examination in all cases of pyrexia and instituting early specific treatment.

Keywords: eschar, fever, primary health care, scrub typhus

Introduction

Scrub typhus is a mite-borne febrile illness is caused by rickettsia Orientia tsutsugamushi .In the endemic Asia-Pacific region, one billion people are estimated to be at risk of infection and one million cases of scrub typhus occur every year.[1] It is an important re-emerging infection in India, affecting multiple organ systems and ranging from a mild disease to one with a mortality rate of up to 70 percent, especially in untreated cases.[2]

Orientia tsutsugamushi is inoculated by the bite of the larval stage 'chigger' of the trombiculid mite. A black area of necrosis called eschar maybe seen at the site of bite and may provide key to the diagnosis.[3]

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Chigger activity is determined by temperature and humidity hence seen in the tropics throughout the year.[4] Human infection of scrub typhus is acquired by outdoor occupation or activity in areas of scrub growth teeming with mites, hence the name.[5] Deforestation, urbanization, climate change and natural calamities may enable migration of rodents carrying infected mites to more urban and non-endemic areas.[1]

Scrub typhus, for many years, was thought to be confined to areas of the tsutsugamushi triangle.[6]Evidence from recent serological and molecular studies confirm the presence of scrub typhus beyond the endemic triangle.[6,7] Case reports and outbreaks have been reported from Africa, South America and UAE.[7,8] Cases in Europe and America have been traced to Asia and acquired by 'eco-tourism'.[9,10]

In India, the disease was first seen among troops during World War II in Assam and West Bengal, and during Indo-Pak war in 1965.[11] However it was only in 1990 that the illness resurfaced at Pakistan border of India.[12] Maybe empirical treatment of fever with tetracyclines, extensive use of insecticides and better protective clothing led to reduced incidence.[13] Case reports have since been made from many Indian states. Scrub typhus is under-diagnosed and under-reported, even though field epidemiology studies show prevalence of infection almost all over India.[1]

Symptoms of Scrub typhus appear in 5-14 days (even up to 21 days) and include fever, rash, myalgia, lymphadenopathy, nausea, vomiting, eschar (a painless punched out ulcer up to 1 cm wide with a black necrotic centre), abdominal pain, and non-specific flu-like symptoms.

The mortality due to scrub typhus depends on various factors like geographical location, pathogenic strain involved and various host factors such as age, immune status, co-morbidities and are due to complications like acute renal failure, and disseminated intravascular coagulation (DIC), acute respiratory distress syndrome, myocarditis, and meningoencephalitis.[1,14]

Inflammatory host response to invasion of skin by Orientia tsutsugamushi through chigger bites results in an eschar. With serological diagnosis being unavailable, costly and sensitive only after days of symptom onset, eschar is the key diagnostic feature specific to scrub typhus. It starts as a central vesicle surrounded by erythema which progresses to form a black crust with surrounding erythema and as the scale on the crust mounts, a typical eschar forms at 6-8 days of onset.[15] Being painless, they should be diligently looked for in case of clinical suspicion and patient followed up as they may erupt during the course of illness. Though presence of eschar at mite biting site is a specific (98.9%) marker and clinches the diagnosis, however, the presence of eschar varies extensively in patients from 7 to 97%[16,17], maybe even uncommon in Asian population18 .When present, groin, axilla,genitalia, abdomen and chest are common sites.[19]

We have studied 31 patients who presented with febrile illness and were treated on the lines of scrub typhus solely on the basis of appearance of eschar and confirmed by serology later.

Aim and Objectives

To observe the age, gender and occupational profile of patients diagnosed with scrub typhus at our center during the period from January 2017-19

To find out about the site and day of appearance of eschar with respect to duration of fever

To note the clinical features and complications of scrub typhus

Materials and Methods

The setting for this study was a primary health care set-up with in-patient facility, located in a hilly rural place 35 Km from the Trivandrum city. It caters to the needs of a population which is composed mostly of laborers and farmers. There was an epidemic of Scrub typhus in the region as early as 2004 which prompted this study from Jan 2017-2019. All patients who presented with fever, who developed an eschar and confirmed to be scrub typhus by IgM ELISA serology test performed on the 10th day after onset of fever formed our study sample. A written informed consent to participate in the study as well as for photographs was taken from all patients.

In all patients with high grade fever in whom

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scrub typhus was one of the differential diagnoses, a thorough inspection of whole of the body including perineum, axilla and genitalia was done after undressing the patient and in proper lighting and this was repeated every day. The emergence of eschar with respect to time of onset of fever was noted and photographs taken. Relevant routine blood investigations to investigate fever were done like complete blood count, erythrocyte sedimentation rate, Blood sugar levels, Liver function tests, Serum creatinine, C-reactive protein and Lactate Dehydrogenase. X ray chest, ECG were done when indicated. On the 10th day of fever, serological test namely IgM antibody for scrub typhus was sent in patients who developed an eschar. As a part of routine evaluation of pyrexia, antibodies for Dengue, Leptospirosis and Mycoplasma were done.

When eschar was observed, patient was started on Azithromycin 500 mg OD for 7 days empirically even before getting the IgM antibody result. Supportive treatment in the form of parenteral fluids, control of diabetes, hypoproteinemia and anticoagulants in case of venous thrombosis etc. were given when necessary.

Results and Discussion

Evaluation of pyrexia often requires the expertise of a tertiary care centre, as different causes like Enteric fever, Dengue, Leptospirosis, Scrub typhus, Mycoplasma and recently Covid-19 have to be ruled out. There are only a few prospective studies on scrub typhus in India from a rural care centre as ours, like the one in Rajasthan which has similarity to the current study. However, this too was in a tertiary care hospital.[20,21]Similar reports from Kerala state are few especially concerning pediatric age group and are from tertiary care centres.[22,23,24,25]

Female preponderance was seen among adults with a ratio of 2.2. Maximum number of cases (8,25%) was between 30 to 40 years of age. Similar findings were noted in other studies[26,27] The youngest patient was 3 years of age. The four pediatric patients were in the range of 2 to 4 years, three being females. The adults were daily wage laborers involved in outdoor work among scrubs and bushes.
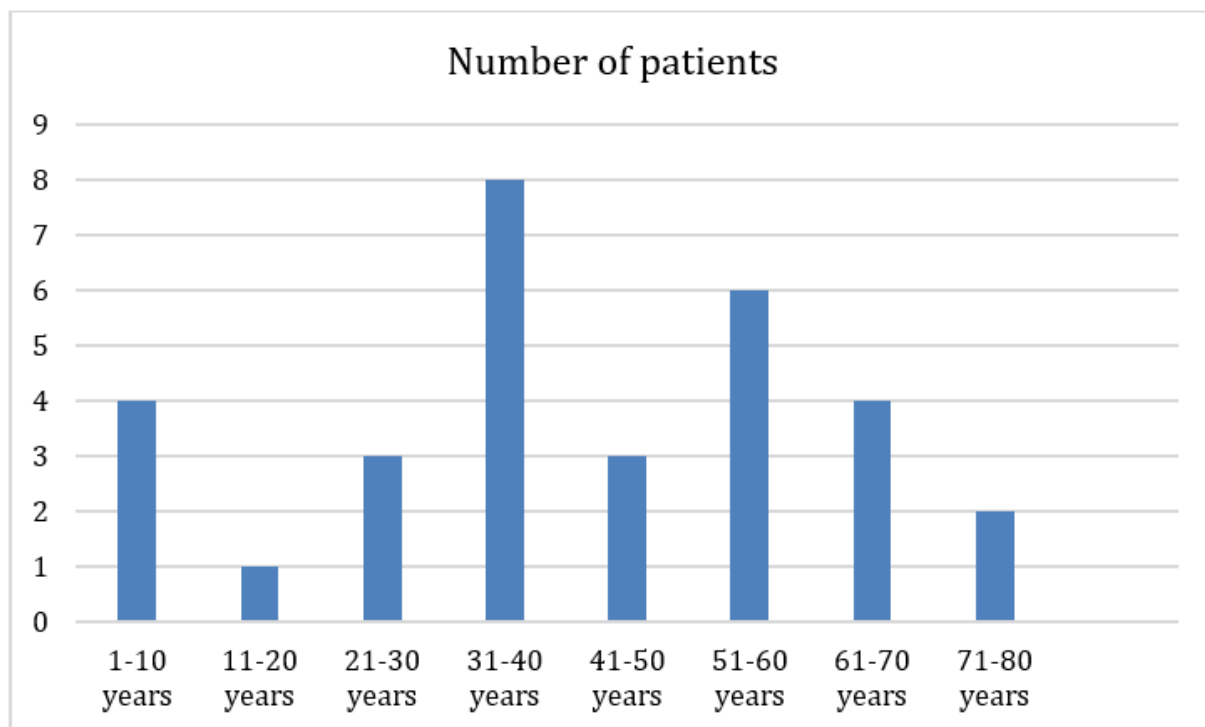

Chart 1: Chart showing age-distribution of patients

Among adults, mean duration of fever at presentation was 3.6 days and ranged from 2 days to up to 10 days. Only six adult patients had fever of

5 days or more. Among children, the mean duration of fever was 4.6 days with a range of 2 to 7 days. Temperature at presentation was in the range of

101 ° F- 103°.None of these patients had taken any specific treatment other than paracetamol for their fever before presenting to us. The duration of fever at presentation varies from mean 8 to 10 or more days in most of these studies conducted at tertiary care centres.[28] Cases have reported with as early as 2 days of fever in this study which will be the case in most of the rural health care centers in India.

Table 1: Table showing the clinical features of the pediatric cases of scrub typhus

Case no	Age	Sex	Clinical features	Signs	Eschar characteristic
1	4 1/2yrs	F	Fever, Abd pain, diarrhea, vomiting	Dehydrated Abdominal distension	Perineum 6th day
2	2yrs	F	Fever, crying, lethargy	–	Lt flank
3	3yrs	M	Fever, body pain	–	Multiple eschars on front and back of chest
3	3	F	Fever, Loose motion	Dehydration	Left side back

In 26 patients (84%), eschar appeared within 5 days of fever. Of which, it appeared on the 3rd day in 11 patients and on 2nd day in 6 patients. Multiple eschars were seen in three patients. In case of multiple eschars, the eruption was not simultaneous.

Table 2: Day of eschar eruption with respect to duration of fever

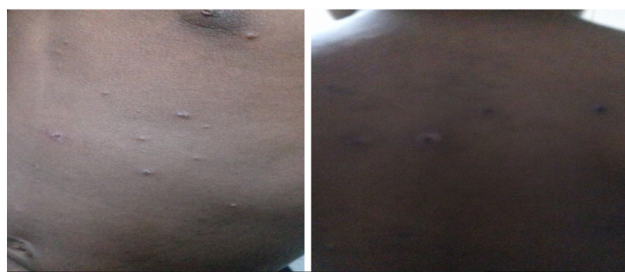| Day of eschar eruption with respect to duration of fever	Number of patients
3rd day	10 adults,1 pediatric
2nd day	6,2 pediatric
4th day	4
5th day	3
6th day	1,1 pediatric
8th day	1
10th day	1
7th day	1

Location of Eschar in adults

Table 3: Table showing distribution of eschar with respect to site among the patients

Region	Number	Percent	Males	Females
Chest and upper back	9	30	3,1 child*	5
Abdomen and Lower back	10	30	2	6,2 child
Upper limb	4	14.5	1	3
Lower limb	3	11	1	2
Perineum/genitals	5	14.5	2	2*,1 child

* had multiple lesions at the same site

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Figure 1: Single ulcer like cigarette-burn type lesion

Figure 2: Figure showing multiple eschars in front and back of chest

Clinical diagnosis can be made even prior to serological diagnosis as was done in this study and prompt treatment instituted. The presence of eschar in a patient with scrub typhus varies widely in different studies, from 9.5% to 86%, with lesser incidence reported from the Oriental countries.[29,30,31] This difference is perhaps related to the skin complexion as erythematous eschar is easily visible and identified in fair-skinned individuals. Studies from Vellore in Tamil Nadu showed eschar pick up rates of 45%–56%[31,32] while Inamdar et al. reported a high incidence of eschar at 75.6%.[33] Another reason for the low incidence of eschars in scrub typhus has also been attributed to the retrospective nature of the studies. The asymptomatic nature, without itching or tenderness and its location in regions like the private parts, loin, back etc. (which cannot be identified by the patient himself) add to the low rates of picking up the eschar. The clothing pattern, previous exposure to pathogen, vasculitis and cutaneous immunity may influence the development of eschar[34]. The eschar resembles a cigarette burn type of shallow ulcer with undermined edges.

Rashes were seen in 6% (2 patients) in this series. Rash becomes apparent after 3-5 days of onset of symptoms Initially rash is in the form of pink, blanching, discrete maculae which becomes maculopapular, petechial or hemorrhagic, may be seen over the trunk and spread to the extremities involving the palm and soles- sparing the face. The chance of picking this up in our population is remote. Rashes and eschar have been picked up as early as 2nd day.[35]

While the indirect immunofluorescence assay (IFA) has been the reference test, this technique is expensive and often unavailable.[36] Hence, ELISA-based estimation of IgM antibodies is now preferred[37]. A limitation of serological tests for the diagnosis of scrub typhus is the insufficient formation of antibodies in the early or acute phases of infection, which could lead to false-negative results. Hence the IgM antibody test was done in suspected cases by 10th day only and showed 100 percent concordance with presence of eschar in our study, stressing on the specificity of eschar in early diagnosis of scrub typhus.

Features associated with Scrub typhus	Number of patients
Hepatosplenomegaly +/- abnormal LFT	9 (1 patient had icterus)
Hearing loss	3
Photophobia	2
Chorea due to hypocalcemia	1
Hypoalbuminemia	3(one of whom was in 1st trimester of pregnancy)
Hematuria with casts	1
ARDS	2
Thrombocytopenia with ecchymosis	1

Except in three adults, all the rest were treated with Azithromycin at our centre and all of them recovered and there was no relapse. Notably, none of our patients showed generalized lymphadenopathy. There was no mortality.

O.tsutsugamushi infects the endothelium of the small blood vessels causing disseminated immune-mediated lympho-histiocytic vasculitic illness,

resulting in severe complications such as acute respiratory distress syndrome (ARDS), hepatitis, renal failure, meningoencephalitis, and myocarditis with shock in a varying proportion of patients.[34] TableMyocarditis has been reported to be common among children.[25,38]

The latency for the development of such complications has been observed to be as late as second week or later. But it has been observed that patients with a history of fever of 2 -3 days present with ARDS, develop hypoalbuminemia, gastroenteritis going for shock with short history of fever as in this study. This underlines the importance of early diagnosis.

The one case of scrub typhus complicating pregnancy made a complete recovery despite developing hypoalbuminemia. Scrub typhus complicating pregnancy is associated with high fetal and maternal mortality.[39]

The mortality rate in scrub typhus is reported as 14%–20%.[40] With a, strong awareness of the disease, early detection of eschar assures diagnosis of scrub typhus as evidenced by this study.

Tetracycline, doxycycline, azithromycin, and rifampicin are effective treatment options for scrub typhus and have resulted in few treatment failures.[40]

Conclusion

Early diagnosis and detection of scrub typhus can be done at the primary healthcare centre itself, with high clinical index of suspicion and diligent and daily search for eschar in patients of pyrexia. This can prevent complications and reduce mortality and reduce the expenditure involved in treatment. Aptly stated by WHO in 1999, "Scrub typhus is probably one of the most underdiagnosed and under reported febrile illnesses requiring hospitalization. Scrub typhus is probably the single most prevalent, under-recognized, neglected, and severe but easily treatable disease in the world".

Ethical clearance- Taken from instituitional committee

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Conflict of Interest - Nil

References

1. Bonell A, Lubell Y, Newton PN, Crump JA, Paris DH. Estimating the burden of scrub typhus: A systematic review. PLoS Negl Trop Dis. 2017 Sep 25;11(9):e0005838.

2. Xu G, Walker DH, Jupiter D, Melby PC, Arcari CM. A review of the global epidemiology of scrub typhus. PLoS Negl Trop Dis. 2017;11(11):e0006062.

3. Saraswati K, Day NPJ, Mukaka M, Blacksell SD. Scrub typhus point-of-care testing: A systematic review and meta-analysis. PLoS Negl Trop Dis. 2018;12(3):e0006330.

4. Chakraborty S, Sarma N. Scrub Typhus: An Emerging Threat. Indian J Dermatol. 2017;62(5):478-485.

5. Mahajan SK. Scrub typhus. J Assoc Physicians India. 2005; 53:954-8.

6. Jiang J, Richards AL. Scrub Typhus: No Longer Restricted to the Tsutsugamushi Triangle. Trop Med Infect Dis. 2018;3(1):11.

7. Kala D, Gupta S, Nagraik R, Verma V, Thakur A, Kaushal A. Diagnosis of scrub typhus: recent advancements and challenges. 3 Biotech. 2020;10(9):396.

8. Richards AL, Jiang J. Scrub Typhus: Historic Perspective and Current Status of the Worldwide Presence of Orientia Species. Trop Med Infect Dis. 2020;5(2):49.

9. Watt G, Strickman D. Life-threatening scrub typhus in a traveler returning from Thailand. Clin Infect Dis. 1994 ;18(4):624-6.

10. Silpapojakul K. Scrub typhus in the western Pacific region. Ann Acad Med Singapore 1997; 26:794–800.

11. Chogle AR. Diagnosis and treatment of scrub typhus: The Indian scenario. J Assoc Physicians India. 2010;58:11–2.

12. Singh P. Scrub typhus, a case report: military and regional significance. Med J Armed Forces India. 2004;60:89–90.

13. Koh GC, Maude RJ, Paris DH, Newton PN, Blacksell SD. Diagnosis of scrub typhus. Am J Trop Med Hyg. 2010;82(3):368-70.

14. Chaudhry R, Thakur CK, Gupta N, et al. Mortality due to scrub typhus - report of five cases. Indian J Med Res. 2019;149(6):790-794.

15. Park J, Woo SH, Lee CS. Evolution of Eschar in Scrub Typhus. Am J Trop Med Hyg. 2016;95(6):1223-1224.

16. Paris DH, Phetsouvanh R, Tanganuchitcharnchai A, Jones M, Jenjaroen K, Vongsouvath M, Ferguson DP,

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Blacksell SD, Newton PN, Day NP, Turner GD. Orientia tsutsugamushi in human scrub typhus eschars shows tropism for dendritic cells and monocytes rather than endothelium. PLoS Negl Trop Dis. 2012 ;6(1):e1466.

17. Paris DH, Shelite TR, Day NP, Walker DH. Unresolved problems related to scrub typhus: a seriously neglected life-threatening disease. Am J Trop Med Hyg. 2013;89(2):301-7.

18. Cowan GO, Friman G, Günther G. Rickettsial infections In Manson's Tropical Diseases. Gordon C (Edi.) 22nd Edi. London Saunders Elsevier Science. Health Sciences Division. 2008;49:894–7.

19. Kundavaram AP, Jonathan AJ, Nathaniel SD, Varghese GM. Eschar in scrub typhus: a valuable clue to the diagnosis. J Postgrad Med. 2013;59(3):177-8.

20. Takhar, R., Bunkar, M., Arya, S., Mirdha, N., & Mohd, A. (2017). Scrub typhus: A prospective, observational study during an outbreak in Rajasthan, India. The National Medical Journal of India. 2017;30(2):69.

21. N Sharma,M Biswal, A Kumar, K Zaman,S Jain, A Bhalla. Scrub Typhus in a Tertiary Care Hospital in North. Indi Am J Trop Med Hyg. 2016; 95(2): 447–451.

22. Raghunath P, Paul P J, Oommen S, Asokan AG. Detection of scrub typhus at a tertiary health centre in Central Kerala. J Acad Clin Microbiol 2018;20:28-32

23. Saifudheen K, Kumar KG, Jose J, Veena V, Gafoor VA. First case of scrub typhus with meningoencephalitis from Kerala: An emerging infectious threat. Ann Indian Acad Neurol 2012;15:141-4.

24. Sharma AK. Eco-entomological investigation in scrub typhus affected area of Thiruvananthapuram, Kerala (India) and their control/containment measures. Int J Curr Microbiol 2013;2:43-9.

25. Krishnan, R, Pillai, RK, Elizabeth, KE, Shanavas, A, Bindusha, S.Pediatric scrub typhus in Southern Kerala: An emerging public health problem. Clin Epidemiol Glob Health 2016; 4: 89–94.

26. Peesapati N, Lakkapragada R, Sunitha S, Sivaram PV. Clinical manifestations and complications of scrub typhus: A hospital-based study from North Andhra. Astrocyte 2015;2:116-20.

27. Jacob SM, Sekki zhar G, Kanagasabai S, Gopal P, Gopal T, Elumalai S.Seroprevalence and clinical manifestations of scrub typhus infection in Chennai city: A cross-sectional study. Int J Health Allied Sci. 2018;7:201-3.

28. Premraj SS, Mayilananthi K, Krishnan D, Padmanabhan K, Rajasekaran D. Clinical profile and risk factors associated with severe scrub typhus infection among non-ICU patients in semi-urban south India. J Vector Borne Dis. 2018 Jan-Mar;55(1):47-51.

29. Vivekanandan M, Mani A, Priya YS, Singh AP, Jayakumar S, Purty S. Outbreak of scrub typhus in Pondicherry. J Assoc Physicians India. 2010;58:24-8.

30. Mahajan SK, Rolain JM, Kashyap R, Bakshi D, Sharma V, Prasher BS, Pal LS, Raoult D. Scrub typhus in Himalayas. Emerg Infect Dis. 2006;12(10):1590-2.

31. Chrispal A, Boorugu H, Gopinath KG, Prakash JA, Chandy S, Abraham OC, et al. Scrub typhus: An unrecognized threat in South India – Clinical profile and predictors of mortality. Trop Doct 2010;40:129-33.

32. Paris DH, Phetsouvanh R, Tanganuchitcharnchai A, Jones M, Jenjaroen K, Vongsouvath M, et al. Orientia tsutsugamushi in human scrub typhus eschars shows tropism for dendritic cells and monocytes rather than endothelium. PLoS Negl Trop Dis 2012;6:e1466.

33. Inamdar S, Thunga G, Acharya R, Vijayanarayana K, Shridharan N, Bhrugu P. Study of clinical characteristics and treatment pattern of scrub typhus in tertiary care hospital J Pharm Sci Res 2013;5:107-10.

34. Abhilash KP, Gunasekaran K. Eschar: A vital clue for diagnosis of scrub typhus. Curr Med Issues 2019;17:134-7

35. Shikino K, Ohira Y, Ikusaka M. Scrub Typhus (Tsutsugamushi Disease) Presenting as Fever with an Eschar. J Gen Intern Med. 2016 ;31(5):582.

36. Phetsouvanh R, et al. Inter- and intra-operator variability in the reading of indirect immunofluorescence assays for the serological diagnosis of scrub typhus and murine typhus. Am J Trop Med Hyg. 2013;88:932–936.

37. Janardhanan J, Trowbridge P, Varghese GM. Diagnosis of scrub typhus. Expert Rev Anti Infect Ther. 2014 Dec;12(12):1533-40.

38. 38(40)Kumar M, Krishnamurthy S, Delhikumar CG, Narayanan P, Biswal N, Srinivasan S. Scrub typhus in children at a tertiary hospital in Southern India clinical profile and complications. J Infect Public Health 2012;5:82-8

39. Rajan SJ, Sathyendra S, Mathuram AJ. Scrub typhus in pregnancy: Maternal and fetal outcomes. Obstet Med. 2016 Dec;9(4):164-166

40. (41) El Sayed I, Liu Q, Wee I, Hine P. Antibiotics for treating scrub typhus. Cochrane Database Syst Rev. 2018 Sep 24;9(9):CD002150.

Changes in Thyroid Hormones Serum Profiles During Late Pregnancy and Post Lambing in the Awassi Sheep

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Abstract

Thyroid gland (TG) function and thyroid hormones (TH) activities are vital to sustaining the productive performance of sheep. Changes in serum TH concentrations are an indirect measure of the changes in thyroid activity and circulating TH, which are considered indicators of the metabolic and nutritional status of the animals. Pregnant Awassi ewes (n=17) were utilized to assess the changes in the serum profiles of thyroid-stimulating hormone (TSH), 3,3′,5-triiodothyronine (T3), and thyroxine (T4) 4 days prior to lambing (D/BL) and at 2,6,10,14,18 and 22 weeks post-lambing (W/PL). Our study revealed the TSH serum profile had gradually and significantly increased (p< 0.05) between 4D/BL and 22W/PL. TSH levels recorded their lowest drop at 4D/BL, while also peaking at 22W/PL. TSH levels at 22W/PL was two times as high as the TSH levels at 4D/BL. Here we demonstrated that T3 concentration didn't exhibit a particular trend throughout all intervals and that the T3 levels attained their peak levels at 2W/PL, while these levels dropped significantly at 14W/PL. Furthermore, we exhibited a significant decrease in T4 level (p < 0.01) at 6W/PL, while a significant increase (p<0.05) in its level was recorded at l0W/PL. T4 levels did not display any specific pattern; apart from its lowest concentration at 6W/PL and its highest at 10W/PL, the T4 levels remained almost in parallel, with minor fluctuations throughout all intervals. Analysis of the T4:T3 ratio at various intervals didn't reveal any specific trend. Our study provides vital elements on the serum profiles of TH in pre-and postpartum periods, which mirrors physiological changes and allows the monitoring and manipulation of thyroid physiology, to improve animal health and production.

Key Words: T3. T4 . TSH, Awassi sheep

Introduction

TH play an essential role in the mechanisms permitting the animals to live and breed in the surrounding environment. Proper TG function and activity of TH are considered critical to supporting the productive performance in sheep and circulating TH can be considered indicators of the metabolic and nutritional status of the animals[1,2]. Changes in serum TH concentrations are an indirect measure of the changes in TG activity. It's been reported there is a marked seasonal variation in thyroid activity and in serum TH, while variations in TH levels are crucial in the free-ranging and grazing animals, whose main physiological functions are markedly seasonal. Variations in hormone bioactivity allow the animals to adapt their metabolic balance to different environmental conditions, changes in nutrient requirements and availability, and homeorhetic changes during different physiological stages. It's

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been suggested that TH are highly involved in the expression of endogenous seasonal rhythms, such as reproduction and hair growth cycles in fiber-producing sheep and goats. Several endogenous and environmental factors may influence TG functionality and serum TH concentrations, by acting at the level of the hypothalamus, pituitary, and/or TG.

The TG facilitates normal growth and maturation of animals by maintaining the level of metabolism in tissues at an optimal rate for normal function[3]. It has been extensively reported the reproductive system in both male and female animals requires a normal amount of TH for adequate function[4]. Severe hypothyroidism is often associated with infertility[5]. In pregnant animals, TH are important not only for the development of the fetus but also for the survivability of the pregnant mother. In lactating females, a series of hormonal interactions are needed to maintain normal lactation including the availability of high TH levels[6]. Our investigation reports for the first time the changes in TH serum profiles during the late pregnancy and post-lambing in the Awassi Sheep. This gives us a better understanding on the impact of TG activity and TH function on Awassi ewe's physiology. Increased serum TSH levels, except in extreme cases, translate to an insufficiency in the saturation of T3 receptors in the brain, regardless of the level of serum TH. Hence, elevated serum TSH indicates the potential risk of iodine deficiency in brain development in newborns[7]. Serum T4 and T3 are less specific indicators of iodine deficiency since they are modified usually only in conditions of at least moderate iodine deficiency[8], although these levels are largely influenced by age and sex[9]. It is well known that age-related changes in the metabolism of T3 and T4 may affect the activity of TH during development. During the critical period of brain maturation in mammals, T3 metabolism reaches the highest levels[10]. Conversely, aging reduces the conversion of T4 to T3 in the liver and brain[11]. These modifications in thyroid metabolism may be responsible for sub-optimum thyroid status during aging[12]. In moderate and severe iodine deficiency, serum T4 is low but T3 is variable, occasionally high due to preferential T3 secretion by the thyroid. Despite low serum T4 is considered a protective mechanism for most parts of the body, except the brain, where T3 is produced locally and not derived from the circulating T3[13]. A biochemical picture associating elevated serum TSH despite normal serum T4 and T3 is called subclinical hypothyroidism whereas overt hypothyroidism associates elevated TSH and low T4 with variable levels of T3. Evaluation of the TH in animals is challenging. Blood concentrations of TH are extremely variable. Moreover, it is quite difficult to compare sporadic data from various authors because of different conditions and analytical methods[14]. This study was aimed at the determination of TSH, T4, and T3 in the blood serum in various age categories of the Awassi sheep. In summary, our data can be used for the purposes of diagnosis and prognosis of diseases, for criteria of adaptability, as well as to elucidate many other physiological mechanisms in sheep. The present study was conducted to assess the TH levels of Awassi sheep throughout various intervals of development, and during the transition period from pregnancy to postpartum period.

Materials and Methods

A. Animals

Our investigation was conducted by utilizing pregnant Awassi ewes (n=17), and their ages ranged between 3-4 years old. The animals were raised as flocks at the State Board for Agricultural Research at Al-Shualla station, Baghdad. The animals were housed in free stalls under normal ambient temperature and were allowed to graze on pastures, in addition, they were fed concentrates and hay daily.

B. Blood Sampling

Blood samples were collected via the jugular vein during the last 3-4 days of pregnancy and continued through 2, 6, 10, 14, 18, and 22 weeks after lambing. Blood samples were stored in the absence of anticoagulant factors, and the serum was collected from each sample after centrifugation at 1500 rpm for 10 minutes and stored at -20°C until assayed.

C. Radioimmunoassay

Serum concentrations of thyroid-stimulating hormone (TSH), 3,3',5-triiodothyronine (T3), and thyroxine (T4) were measured by radioimmunoassay (RIA) using readily available kits (Amersham International, UK).
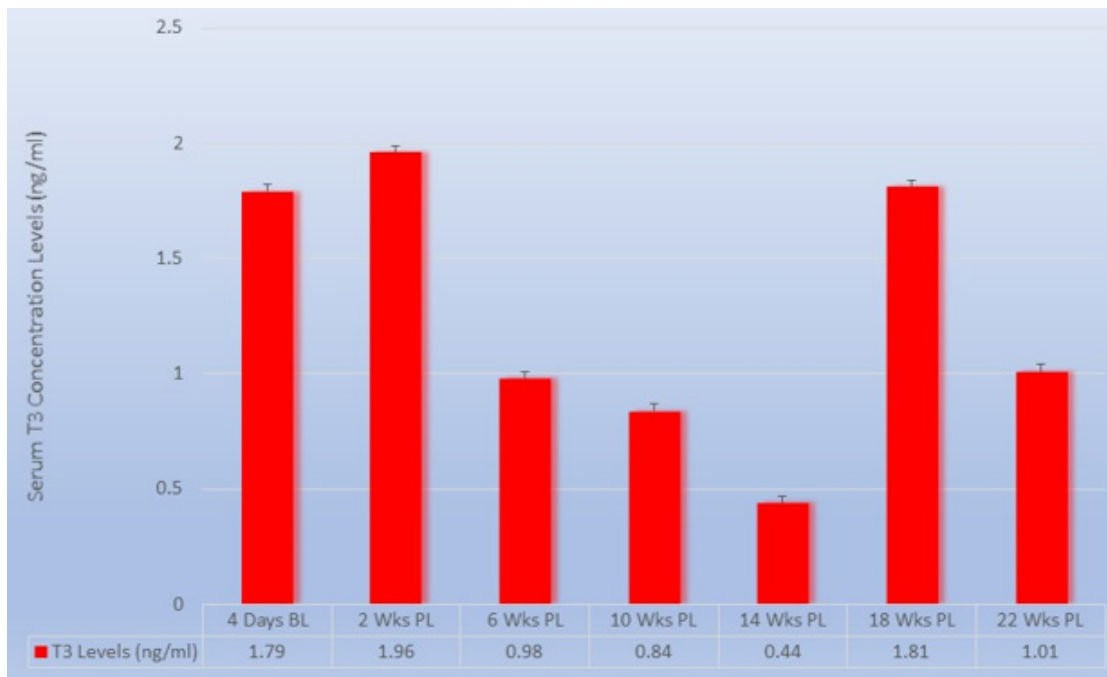
D. Statistical Analysis

Data were analyzed by the analysis of variance (ANOVA), and means were further tested by Duncan's multiple range tests (as a post hoc test) that was used to evaluate the significance of differences between the various intervals of this study. A p-value <0.05 was considered statistically significant. Each piece of data was the result of the mean ± the standard deviation of the values obtained from six replicates[24].

Results

Our investigation demonstrated the TSH serum profile had gradually and significantly increased (p< 0.05) between 4D/BL and 22W/PL (Fig. 1). TSH levels recorded their lowest drop at 4D/BL, whereas they reached their peak at 22W/PL. The TSH concentration at 22W/PL was 2 times higher than the TSH levels at 4D/BL. Our study showed that T3 concentration didn't exhibit a specific trend throughout all intervals (Fig. 2). The levels of T3 hormone were significantly high at 4D/BL, while the T3 attained their peak levels at 2W/PL, however, these levels dropped significantly (p<0.01) at 14W/PL as compared to all other intervals. Furthermore, there were no significant differences in T3 levels in the other periods (Fig. 2). Moreover, our data exhibited a significant decrease in T4 level (p < 0.01) at 6W/PL, whereas a significant increase (p<0.05) in its level was recorded at 10W/PL, which was significantly higher than all levels in the other recorded periods (Fig. 3). The T4 levels didn't display any specific pattern; apart from its lowest concentration at 6W/PL and its highest at 10W/PL, the T4 levels remained almost in parallel, with minor fluctuations throughout all intervals. Analysis of the T4:T3 ratio at various intervals didn't reveal any specific trend.

	4 Days BL	2 Wks PL	6 Wks PL	10 Wks PL	14 Wks PL	18 Wks PL	22 Wks PL
T3 Levels (ng/ml)	1.79	1.96	0.98	0.84	0.44	1.81	1.01

Fig.1. Serum T3 Concentrations in Awassi Ewes Before and Post Lambing

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	4 Days BL	2 Wks PL	6 Wks PL	10 Wks PL	14 Wks PL	18 Wks PL	22 Wks PL
■ T4 Levels (ng/ml)	5.3	5.7	3.98	6.4	5.5	5.3	5.4
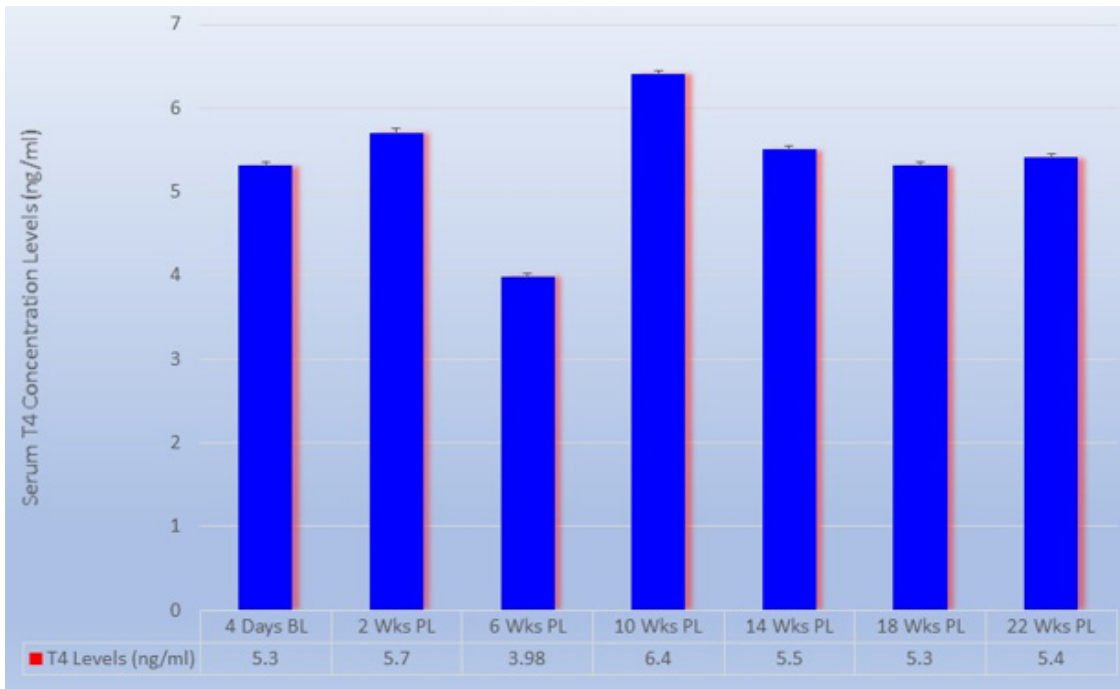
Fig.2. Serum T4 Concentrations in Awassi Ewes Before and Post Lambing

	4 Days BL	2 Wks PL	6 Wks PL	10 Wks PL	14 Wks PL	18 Wks PL	22 Wks PL
■ TSH Levels (ng/ml)	0.92	0.98	1.04	1.1	1.16	1.43	1.93
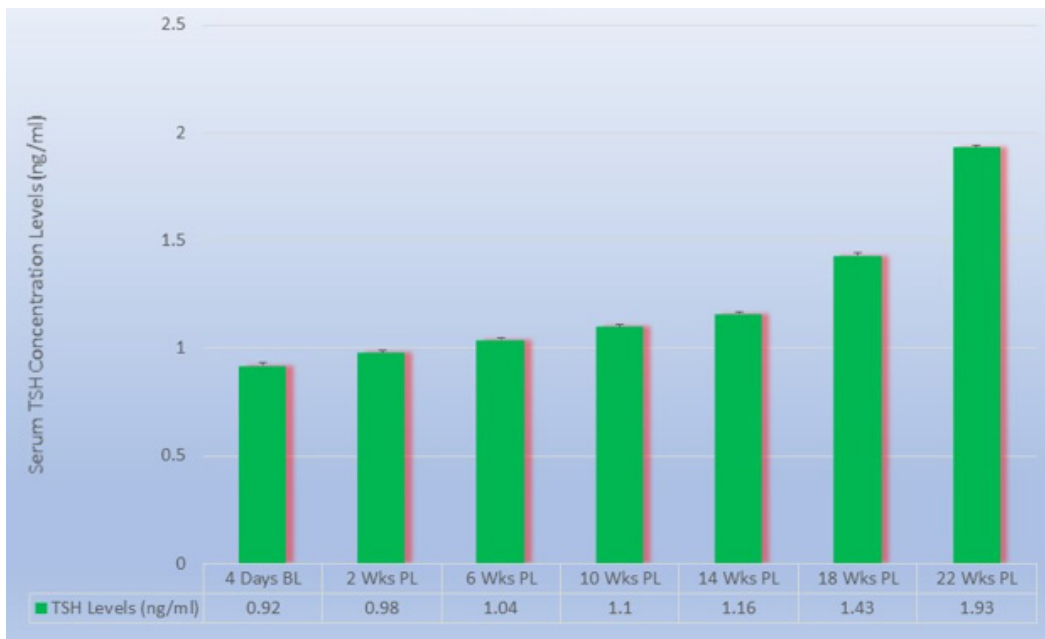
Fig.3. Serum TSH Concentrations in Awassi Ewes Before and Post Lambing

Discussion

Changes in blood TH concentrations are an indirect measure of the changes in the TG and extrathyroidal deiodination activity. Many factors act simultaneously, modulating TG activity and peripheral monodeiodination. In addition to endogenous and environmental climatic factors, nutrition plays a primary role in TG activity and blood TH concentrations. The physiological range of the endocrine responses to different conditions is very large, thus reference values are very difficult to obtain. Assay results must be carefully evaluated, not only for diagnostic and clinical purposes but also to evaluate the physiological states and responses of the animals. The systemic actions of TH validate

their critical role in the mechanisms permitting the animals to adapt to the surrounding environment.

Our data pertaining to TH during various reproductive stages in the Awassi sheep are comparable to data that have been reported in other studies that tackled other breeds of sheep[15]. It's highly plausible that high levels of T3 (Figs. 2) and T4 (Figs. 3) which have been observed throughout the last 4 days of pregnancy may indicate an increase in maternal metabolism to provide the necessary physiological requirements for the crucial task of parturition as well as setting the stage for the initiation of lactation. Our results are in accord with previous clinical observations which have been noted in other mammalian species[16,17,18]. Moreover, an increase in estrogen levels during late pregnancy is associated with an increase in total serum T4 levels in ewes[15]. The marked depression of T3 [6-14 (W/PL)] and T4 [6 (W/PL)] may be due to the mammary gland drain of iodine, which may lead to the decline in the availability of a crucial element of the TH biosynthesis[19]. The presence of a time window between the initiation of the decline in T4 (6W/PL) and T3 at (4W/PL), may indicate the greater rate of T4 conversion to T3[20] and thus maintaining T3 levels for an extensive period. Evidently, the increase in TSH level at 14W/PL (Fig. 1) appears to coincide with the initiation of the T3 increase (Fig. 1), and this may justify the increase in T3 levels. It's noteworthy that the increase in T3 and T4 levels is due to the release of pituitary TSH, which has been proven to stimulate most if not all steps of TH biosynthesis, from the uptake of iodine (by enhancing NIS expression) to internalization of Tg from the follicular lumen and consequent secretion of TH into the bloodstream[21]. In summary, our investigation provides useful information on thyroidal secretion in Awassi ewes just before and immediately after PL. This investigation provides vital elements on the serum profiles of TH in pre- and postpartum periods[22]. Hence, our investigation may have a huge potential in aiding ovine experts as well as sheep producers to better understand the hormonal status and the frequent hormonal fluctuations in ewes during lactation[23]. Our insight mirrors physiological alterations and allows the monitoring and manipulation of thyroid physiology to improve animal health and production.

Conflict of Interest: None declared.

References

1. Ismail M, Al-Hamdi N. The Influence of Age, Gender, Type of Pregnancy, and Climatic Variations on the Serum T3 and T4 Hormones Profile in Growing Awassi Sheep. Indian Journal of Public Health Research & Development. 2022;3:160-164.

2. Todini L. Thyroid hormones in small ruminants: effects of endogenous, environmental and nutritional factors. Animal. 2007;1(7):997–1008.

3. Dittrich R, Beckmann MW, Oppelt PG, Hoffmann I, Lotz L, Kuwert T, et al. Thyroid hormone receptors and reproduction. J Reprod Immunol. 2011;90(1):58–66.

4. Choksi NY, Jahnke GD, St Hilaire C, Shelby M. Role of thyroid hormones in human and laboratory animal reproductive health. Birth Defects Res B Dev Reprod Toxicol. 2003;68(6):479–91.

5. The impact of thyroid diseases starting from birth on reproductive function. Krassas GE, Markou KB.Hormones (Athens). Hormones. 2019;18(4):365–81.

6. Gerendai I, Sziebert P, Görcs T, Csaba Z, Csernus V. Effect of intratesticular administration of TRH or anti-TRH antiserum on function of rat testis. Life Sci. 2000;67(3):269–81.

7. Delange F. Screening for congenital hypothyroidism used as an indicator of IDD control. Thyroid. 1998;8:1185–92.

8. World Health Organization. Assessment of the Iodine Deficiency Disorders and monitoring their elimination. Geneva; 2007;3rd edition.

9. Delange F, Braverman LE, Utiger RD. The thyroid: A fundamental and clinical text. Philadelphia: Lippincott publ; 2000.

10. Naidoo S, Timiras PS. Effects of age on the metabolism of thyroid hormones by rat brain tissue in vitro. Dev Neurosci. 1979;2(5):213–24.

11. Margarity M, Valcana T, Timiras PS. Thyroxine deiodination, cytoplasmic distribution and nuclear binding of thyroxine and triiodothyronine in liver and brain of young and aged rats. Mech Ageing Dev. 1985;29(2):181–9.

12. Latham KR, Tseng Y-CL. Nuclear thyroid hormone binding activities and serum iodothyronine levels in aging rats. Age (Dordr). 1985;8(2):48–54.

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13. Silva JE, Dick TE, Larsen PR. The contribution of local tissue thyroxine monodeiodination to the nuclear 3, 5, 3-triiodothyronine in pituitary, liver and kidney of euthyroid rats. Endocrinology. 1978;103:1196–207.

14. Todini L. Thyroid hormones in small ruminants: effects of endogenous, environmental and nutritional factors. Animal. 2007;1(7):997–1008.

15. Anderson GM, Connors JM, Hardy SL, Valent M, Goodman RL. Thyroid hormones mediate steroid-independent seasonal changes in luteinizing hormone pulsatility in the ewe. Biol Reprod. 2002;66(3):701–6.

16. Glinoer D, De Nayer P, Bourdoux P, Lemone M, Van Steirteghem RC, Kinthaert A, et al. J Clin Endocrinol Metab. 1990;71(2):276–87.

17. Nissim M, Giorda G, Ballabio M, D'Alberton A, Bochicchio D, Orefice R, et al. Maternal thyroid function in early and late pregnancy. Horm Res. 1991;36(5–6):196–202.

18. O'Leary PC, Boyne P, Atkinson G, Mileham KJ, James I. Longitudinal study of serum thyroid hormone levels during normal pregnancy. Int J Gynaecol Obstet. 1992;38(3):171–9.

19. Vanjonack WJ, Johnson HD. Effects of moderate heat and milk yield on plasma thyroxine in cattle. Vanjonack WJ, Johnson HD. J Dairy Sci. 1975;58(4):507–11.

20. Ganong's ;. K., Yuan H. Ganong's Review of Medical Physiology. 2022.

21. Hoermann R, Midgley JEM, Larisch R, Dietrich JW. Homeostatic control of the thyroid-pituitary axis: Perspectives for diagnosis and treatment. Front Endocrinol (Lausanne). 2015;6:177.

22. Burrow GN, Fisher DA, Larsen PR. Maternal and fetal thyroid function. N Engl J Med. 1994;331(16):1072–8.

23. McGuire MA, Beede DK, Collier RJ, Buonomo FC, DeLorenzo MA, Wilcox CJ, et al. Effects of acute thermal stress and amount of feed intake on concentrations of somatotropin, insulin-like growth factor (IGF)-I and IGF-II, and thyroid hormones in plasma of lactating Holstein cows. J Anim Sci. 1991;69(5):2050–6.

24. Domenech-Coca C, Mariné-Casadó R, Caimari A, Arola L, Del Bas JM, Bladé C, et al. Dual liquid-liquid extraction followed by LC-MS/MS method for the simultaneous quantification of melatonin, cortisol, triiodothyronine, thyroxine and testosterone levels in serum: applications to a photoperiod study in rats. J Chromatogr B Analyt Technol Biomed Life Sci. 2019.

Prevalence of Cervical Human Papillomavirus Infection among Women of Childbearing Age in FMC ASABA, Nigeria

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Abstract

Background: Cervical Human Papillomavirus infection prevalence varies with different environments. Knowledge of this will help in some cervical cancer interventions such as early and continuous screening. This study is aim at determining the prevalence of cervical HPV infection among women of childbearing age attending Federal Medical Center Asaba, Nigeria.

Materials and methods: A total of 99 consenting women aged between (20 -45) years were randomly recruited and screened for HPV infection using virtual inspection by acetic acid (VIA) method. Semi-structured questionnaire was used to obtain the demographic characteristics, bio data and reproductive history of the participants. Statistical analysis was done using IBM SPSS statistics version 21.

Results: The result shows that 21(21.21%) out of 99 women that participated in the study were VIA positive. 16(76.19%) out of the 21 HPV infected women showed cervicitis, 4(19.05%) had cervical polyps, 1 (4.16%) had invasive cervical cancer while, 1(4.16%) of the participants had HPV only. Age-specific prevalence was highest among the age group 36 – 40 years with age groups 20 – 25 and 41-45 having the same value. **Conclusions**: HPV prevalence rate is high among the study population especially in women of aged between (36-40) years. Early commencement of sexual intercourse among others was associated with HPV positive. Advanced and effective method of screening is highly recommended in low income settings. Urgent and adequate interventions

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is recommended for regular HPV screening among women of reproductive age to reduce the spread of cervical cancer.

Keywords: Prevalence, HPV infection, Cervical Cancer, reproductive age, VIA, Nigeria

Introduction

Human papillomavirus (HPV) is the most sexually transmitted virus[1]. Majority of the sexually active population contact with HPV at least once in a lifetime[2]. But most of these viruses will clear on their own. When the host can't clear the infection on their own, it leads to several human cancers, mainly cervical cancer[3,4]. Although all age groups can be affected, there appears to be a higher prevalence in young women[5,6,7]. The prevalence of HPV ranged from 1.5% in Spain to 38.8% in Kenya[8,9]. In Nigeria, different figures have been documented in the different zones of the country. In Ibadan, South-West Nigeria, cervical HPV was identified in 26.3% of sexually active women above 15 years and 14.7% among 1282 women in Irun[6,10]. In Okene, North-Central Nigeria, a prevalence of 21.6% among 231 women was documented[11].

There is a paucity of data on the prevalence of HPV and serotypes in this region hence, the present study is designed to assess the prevalence and factors associated with cervical HPV infection especially in women of childbearing age in FMC Asaba, Nigeria.

Materials and Methods

This was a cross-sectional study carried out between June, 2021 and December, 2021. The study determined the prevalence of HPV positivity in women of reproductive age visiting various clinics at Federal Medical Center, Asaba, Delta State, Nigeria using standard VIA inspection methods. Ninety-nine consenting women were randomly recruited into the study.

Inclusion and Exclusion criteria

Only women within their reproductive age (20 -45) years were included in the study.

Women below 20 years and above 45 years old were excluded from the study. Women that are pregnant, menstruating, and had undergone a hysterectomy at the time of this study were excluded.

Participant recruitment

The participants were randomly selected. Social-demographic details and reproductive history of the participants were obtained using a semi-structured questionnaire.

Laboratory investigation

Diagnostic investigations were carried out by a pathologist and nurses according to world health organization guidelines[12] for VIA screening method. Routine quality assurance was strictly employed during the screening exercise. After the insertion of a sterile vaginal speculum, the VIA testing was done by applying freshly prepared 4% acetic acid in the cervix. The results are taken after 1 minute using a halogen lamp to provide good illumination. The test screening is recorded as positive if a well-defined dense aceto- white area with regular margins appeared attached to the squamo-columnar junction (SCJ) or if the entire cervix or cervical growth turned white and negative if there is no observed changes or ulcerative growth in the cervix[13]. Colposcopy was done to grade the precancerous and cancerous lesions and were biopsies taken from areas which were suspiciously as abnormal. Colposcopic findings were reported as normal, cervicitis, probable low- or high-grade precancerous lesions, or suspected invasive cancer. The findings were properly explained to all the HPV positive participants and all were immediately referred to gynecological unit at FMC Asaba for further investigations, biopsies and proper treatments and follow ups according to stipulated guidelines by Health[14], on cervical cancers management.

Results

The mean age of the 99 women that participated in the study was 39.88 years. HPV was detected in 21 out of the 99 participants, giving a prevalence rate of 21.21%. 22 (22.22%) of 99 subjects had cervicitis while 7 (7.07%) out of the 99 subjects has cervical polyps. %). The highest HPV prevalence rate of 6(28.5%) was observed among women aged between

36-40 years, while the lowest was among the age group 26-30, 2(9.52%). 16 (76.19%) out of 21 positive HPV participants have both HPV and cervicitis while 4(19.04%) of the had HPV and cervical polyps. Only 1 (4.16%) of the participant had HPV only.

The prevalence of HPV infection in relation to other variables were early sexual intercourse before the age of 18 years were 19(52.38%), 18-20 years were 6(28.5%) while 21-23 years were 4(19.05%), singles were 2(9.52%), married 8(38.10%), and widow 11 (52.35%) (Table 1).

Using bivariate analysis, significant factors associated with HPV infection were age less than 40 (P = 0.0164), marital status (P = 0.0490), number of pregnancy (P = 0.1830), sexual intercourse before age 20 (P = 0.0046), abnormal cervix (P=0.001). (Table 2)
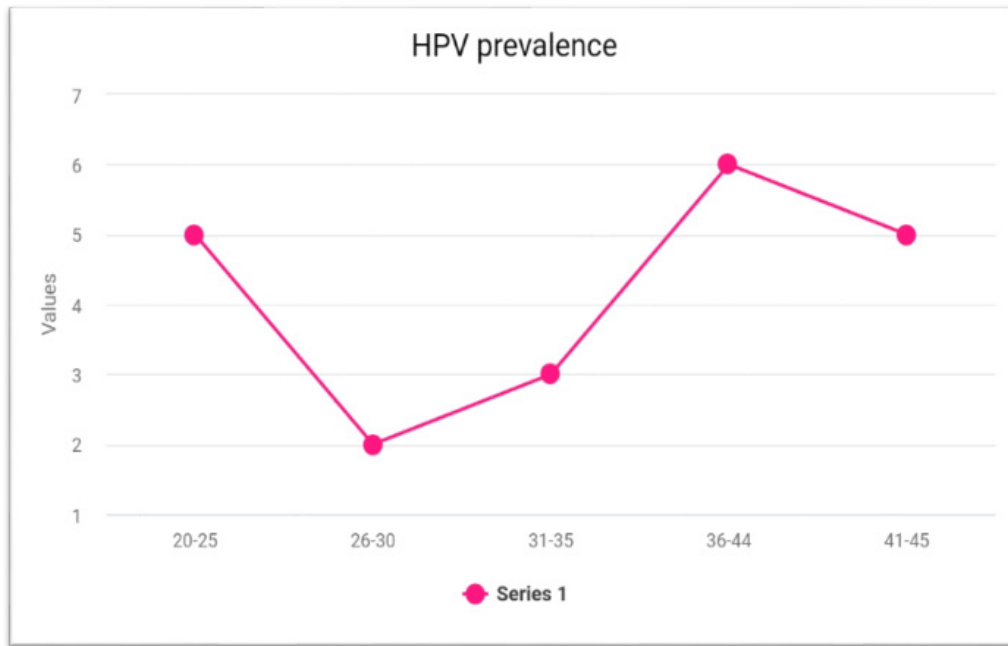

Figure 1. Shows the graphic representation of the age-specific prevalence of HPV in these women showing three different peaks.

Table 1. Social-demographic characteristics of the respondents

Variables	Frequency	Percentage (%)
Age		
20-25	5	23.81
26-30	2	9.52
31-35	3	14.28
36-40	6	28.5
41-45	5	23.81
Marital status		
Single	2	9.52
Married	8	38.10
Widow	11	52.38
No of kids		
5-10	13	61.9
1-4	5	23.81
None	3	14.29

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Variables	Frequency	Percentage (%)
HPV and others		
Cervicitis	16	6.16
Cervical polyp	4	19.05
HPV only	1	4.16
Age at the first sexual intercourse		
15-17	11	52.38
18-20	6	28.5
20-22	4	19.05

Table 2. Association between HPV infection and other variables.

Variables	N	HPV % positive	Chi-square	P-value	degree of freedom
Age			5.62	0.0164	1
>40	16	76.19			
<40	5	23.81			
Marital status			6.000	0.0498	2
Single	2	9.52			
Married	8	38.10			
Widow	11	52.38			
No of pregnancy			8.000	0.1830	2
5-10	13	61.9			
1-4	5	23.81			
None	3	14.29			
HPV and others			18	0.0001	2
Cervicitis	16	76.16			
Cervical polyps	4	19.05			
HPV only	1	4.16			
Age at the first sexual intercourse			8.048	0.0046	1
>20	17	80.95			
<20	4	19.08			

Discussion

There was a prevalence rate of 21(21.21%) HPV infection in women who participated in the present study. Similar reports have been obtained in different parts of the country. A prevalence rate of 21.6% was obtained from Okene, 19.6% in western Nigeria[2, 11], 19.5% in Awka[15] and 26.3% among cytologically normal women in Ibadan, the lowest being14% in Irun, Nigeria[6, 16]. The little differences may be influenced by the age group of the individuals studied, the environment, and variations in methods used.

Age-specific prevalence in this study was highest in the age group 36 - 40 (28.5%) and a slight peak in the age groups 20-25 (23.81%) and 41-45(23.81). In Irun Nigeria, it was documented that HPV prevalence did not decline with age but with slight peaks in women between 15 - 29 and 60 - 69 years old while, in Awka (Nigeria), the highest prevalence was recorded among women aged between 30-39 years with a slight peak among women aged between 60-69 years[6, 15, 17]. Previous report showed that women of very young age have the highest prevalence, middle age group and a second peak in the old age has been consistent[6]. This study though not having ages below 20 and above 45 equally witnessed the same pattern. The high prevalence in the middle group may be due to the fact that the study was one among women

of childbearing age. The two other peaks could be attributed to possible exposure to new sexual partners later in life, especially among the widows and multiple partners by the singles.

The study has shown that there is a relationship between HPV infection and sexual behavior. Early commencement of the sexual activity, number of pregnancies, and cervical state which could result from sexually transmitted infection (STI) were significantly related to HPV infection. These factors may be considered an indicator of early age at first exposure to HPV. In this study, HPV infection was found to be higher among the participants that had their first sexual intercourse before the age of 17 and this is consistent with findings from other studies[18, 19].

Conclusion

HPV prevalence rate is high among the study population especially in women of aged between (36-40) years. Early commencement of sexual intercourse among others was associated with HPV positive. Advanced and effective method of screening is highly recommended in low income settings. Urgent and adequate interventions is recommended for regular HPV screening among women of reproductive age to reduce the spread of cervical cancer.

Ethical clearance and informed consent

Ethical approval was obtained from the board of ethics committee of Federal Medical Center Asaba, Delta State, Nigeria. Prospective participants were approached and the study was explained to them and only consenting women were enrolled.

Conflict of Interest – NIL

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References

1. Centre for Disease Control and Prevention. Human Papilloma virus: HPV Information for Clinicians. 2007. https://www.cdc.gov/std/hpv2.

2. Akarolo Anthony SN, Famooto AO, Dareng BO, Olaniyan OB, Offiong R, Wheeler CM. and Adebamowo CA. Age Specific Prevalence of Human Papilloma virus Infection among Nigerian Women. BMC Public Health. 2014; 14:656-662. https://doi.org/10.1186/1471-2458-14-656.

3. Bosch FX, Lorincz A, Munoz N, Meijer CJ and Shah KV. The Causal Relation between Human Papilloma virus and Cervical Cancer. J Clin Pathol. 2002; 55:244-265. https://doi.org/10.1136/jcp.55.4.244

4. Hang D, Jia M, MaH, Zhou J, Fang X, Lyu Z. Independent Prognostic Role of Human Papilloma virus Genotype in Cervical Cancer. BMC. Infect. Dis. 2017; 17:391.

5. Hammer A, Rositch A, Qeadan F, Gravit PE. and Blaskaer, J. Age Specific Prevalence of HPV 16/18 Genotypes in Cervical Cancer; A Systematic Review and Meta-analysis. Int. J. Cancer. 2016; 138(12): 2795-803.

6. Gage JC, Ajenifuja KO, Wentzensen NA, Adepiti AC, Eklund C, Reilly M, Hutchinson M, Wacholder S, Harford J, Soliman AS, Burk RD, Schiffman M. The Age-Specific Prevalence of Human Papilloma virus and Risk of Cytologic Abnormalities in Rural Nigeria: Implications for Screen-and-treat Strategies. Int J Cancer. 2012; 130: 2111-2117. https://doi.org/10.1002/ijc.26211

7. Watson JD, Baisley K, Brown J, Kavishe JB, Andreasen A, Changalucha J, Mayaud P, Kapiga S, Gumodoka B, Hayes RJ, deSanjosé S. High Prevalence and Incidence of Human Papilloma virus in a Cohort of Healthy Young African Female Subjects. Sexually Transmitted Infect. 2013; 89:358-365. https://doi.org/10.1136/sextrans-2012-050685

8. DeSanjose S, Diaz M, Castel lsague X, Clifford G, Bruni L, Munoz N, Bosch XF. Worldwide Prevalence and Genotype Distribution of Cervical Human Papilloma virus DNA in Women with Normal Cytology: A Meta-Analysis. The Lancet Infect Diseases. 2007; 7:453-459. https://doi.org/10.1016/S1473-3099(07)70158-5

9. DeVuyst H, Steyaert S, van Retergherm L, Claeys P, Muchiril L, Sitati S, Vansteel S, Quint W, Kleeter B, Van Marck E, Temmerman M. Distribution of Human Papilloma virus in a Family Planning Population in Nairobi Kenya. Sexually Transmitted Diseases. 2003; 30:137-142. https://doi.org/10.1097/00007435-200302000-00009

10. Heywood W, Patrick K, Smith AMA and Pitts MK. Associations between Early First Sexual Intercourse and Later Sexual and Reproductive Outcomes: A Systematic Review of Population-Based Data. Archives of Sexual Behaviour. 2015; 44: 531-569. https://doi.org/10.1007/s10508-014-0374-3

Nkiruka R Ukibe, Chinedum C Onyenekwe, Chidimma O Nweke et. al. / Prevalence of Cervical Human Papillomavirus Infection among Women of Childbearing Age in FMC ASABA, Nigeria

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11. Schnatz PF, Markelova NV, Holmes D, Mandavilli SR and O'Sullivan DM. The Prevalence of Cervical HPV and Cytological Abnormalities in Association with Reproductive Factors of Rural Nigerian Women. J Women's Health. 2008; 17:279-285. https://doi.org/10.1089/jwh.2006.0295

12. Organization WH. WHO guidelines for screening and treatment of precancerous lesions for cervical cancer prevention: WHO, 2013.

13. Organization WH. Prevention of cervical cancer through screening using visual inspection with acetic acid (VIA) and treatment with cryotherapy. A demonstration project in six African countries: Malawi, Madagascar, Nigeria, Uganda, the United Republic of Tanzania, and Zambia. WHO, 2012.

14. Health MO. Strategic Plan for Cervical Cancer Prevention and Control in Uganda –2014

15. Ezebialu C, Ezebialu I, Ezeifeka G, Nwobu R, Okani C and Chukwubuike C. Prevalence of Cervical Human Pappilloma virus Infection in Awka, Nigeria. J Biosci Med. 2010; 8: 37-47.doi: 10.1236/jbm.2020.83005.

16. Thomas JO, Herrero R, Omigbodun AA, Ojemakinde K, Ajayi IO, Fawole A, Oladepo O, Smith S, Arslan A, Munoz N, Snijders PJF, Meijer CJLM, Franceschi S. Prevalence of Papilloma virus Infection in Women in Ibadan, Nigeria: A Population Based Study. British J Cancer. 2004; 90: 638-645. https://doi.org/10.1038/sj.bjc.6601515

17. Okolo C, Franceschi S, Adewole I, Thomas JO, Follen M, Snijders, PJF, Meijer CJLM and Clifford GM. Human Papilloma virus Infection in Women with and without Cervical Cancer in Ibadan, Nigeria. Infect Agents Cancer. 2010; 5. Article No. 24.https://doi.org/10.1186/1750-9378-5-24

18. Kahn JA, Rosenthal SL, Succop PA, Ho GFY and Burk RD. Mediators of the Association between Age of First Sexual Intercourse and Subsequent Human Papilloma virus Infection. Paediatr. 2002; 109: e5-e12. https://doi.org/10.1542/peds.109.1.e5

19. Schnatz PF, Markelova NV, Holmes D, Mandavilli SR and O'Sullivan DM. The Prevalence of Cervical HPV and Cytological Abnormalities in Association with Reproductive Factors of Rural Nigerian Women. J Women's Health. 2008; 17:279-285. https://doi.org/10.1089/jwh.2006.0295

Internet Addiction and Associated Factors among Medical Students: A Cross Sectional Study

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Abstract

Background: The internet has ingrained itself into our daily lives. It is utilised for many different things, including communication, information searching, playing games, keeping track of health programmes, and the list goes on. Medical students are one of the vulnerable groups whose academic activities may be negatively impacted by increased internet usage. hence this, study aimsto determine the factors associated with Internet Addiction and to estimate the prevalence of Internet Addiction among medical students.

Materials and Methods: Internet Addiction Test (IAT) scale questionnaire was used to collect data from all the Medical students of ESIC Medical College and hospital, through self-administered questionnaire. Over a period of 3 months a total of 283 responses were received. Further analysis was done using SPSS version 28.0.

Results: The prevalence of Internet Addiction was found to be 36.70%. A statistically significant association was found between duration spent with internet and Internet Addiction, but no other statistically significant association was found between Internet Addiction and other factors.

Conclusions: Internet addiction is an emerging problem of modern era, which has an impact on mental health. It is need of the hour for early recognition of internet addiction and thereby takes appropriate measures to manage and reduce it.

Key-words:Internet Addiction, Prevalence, Medical students, IAT

Introduction

The introduction of the internet has completely changed how people utilise technology, whether or just to pass the time and it has become essential component of daily life. The way individuals use the internet has undoubtedly evolved. India is currently the second-largest internet user in the world. India's use of the internet has been growing rapidly, with 665.31 million internet users in 2019[1]. Internet usage has been personalized. To complete a planned task within a fair amount of time without experiencing any mental or behavioural pain is the healthy way to use it, only few use judiciously and others not.Because of its easy availability and passive entertainment has the potential risk of internet addiction.

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Internet addiction is characterized by excessiveor poorly controlled preoccupations, urges or behavioursregarding mobile or computer use and internet access that lead toimpairment or distress. Misuse of internet has become a health concern worldwide and growing exponentially. Medical students are one of the vulnerable groups for Internet Addiction, as they have academic pressure, so when they spend time on internet for relaxation, they get addicted which reflects on their academic performance. From the various studies conducted previously on Internet Addiction among medical students the prevalence of Internet Addiction is found to be high among medical students[2-11]. Hence, the study was undertaken to estimate the prevalence of Internet Addiction among medical students and its associated factors.

Materials and Methods

Thisis a cross sectional study conducted among 283 medical students of ESIC Medical College, Kalaburagi over a period of 3months from June – August 2022. All the medical students from first year to final year, who are willing to participate, were included in the study after obtaining their consent. Internet Addiction Test (IAT) scale was used to collect data from the medical students. IAT scale is a validated self-administered questionnaire consisting of 20 questions designed to measure internet addiction.The IAT total score is the sum of the ratings given by the examinee for the 20 item responses.Each item is rated on a 5-point scale ranging from 0 to 5. The maximum score is 100 points. Thehigher the score is the higher is the severity of the problem. Total scores that range from 0 to30 points are considered to reflect a normal level of Internet usage; scores of 31 to 49 indicate the presence of a mild level of Internet addiction; 50 to 79 reflect the presence of a moderate level; and scores of 80 to 100 indicate a severe dependence upon the Internet. Each question was given a score of 0 (not applicable) to 5 (always). Theresponses obtained were scored appropriately to derive results. Further Microsoft excel was used to calculate frequency, percentage and chi-square test was used for determining statistical significance.

Results

The study population comprised of total of 283 study subjects among whom 126 (44.53%) were male and 157 (55.47%) are females. Majority of the participants were females (55.5%), hostellers (87.6%), most of them would sleep for 6-7hrs (62.2%), physical activity for 1-2times a week (49.5%) and duration spent on internet was 1-3hrs (54.1%) [Table1]. The prevalence of Internet Addiction (IA) was found to be 36.70% (Mild IA-22.12%, Moderate IA-13.18%, Severe IA-1.40%) and normal level of internet usage was found to be 63.30% [Fig 1].

A statistically significant association was found between duration spent with internet and Internet Addiction, but no other statistically significant association was found between Internet Addiction and other factors [Table 3].

Table No.1: Distribution of respondents with baseline characteristics(n=283)

		Frequency [n]	%
Gender	Male	126	44.53
	Female	157	55.47
Accommodation	Day scholar	35	12.36
	Hosteller	248	87.64
Sleep hours	≤3hrs	3	1.08
	4-5hrs	55	19.43
	6-7hrs	175	61.83
	≥8hrs	50	17.66
Physical activity per week	Nil	47	16.60
	1-2times	140	49.46
	3-4times	54	19.08
	5times and above	42	14.86

Continue.......

		Frequency [n]	%
Duration spent with internet	1-3hrs	154	54.41
	4-6hrs	106	37.45
	7-9hrs	17	6.00
	>9hrs and above	6	2.14

Fig No 1: Prevalence of internet addiction (n=283)
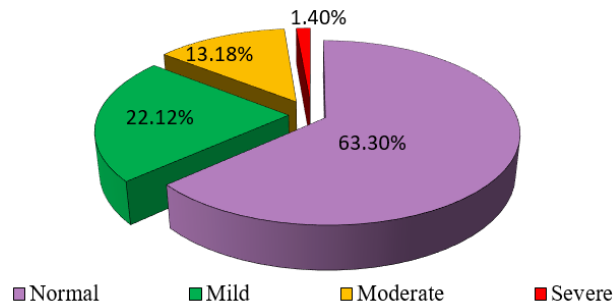
Table No.2: Prevalence of Internet Addiction among medical students (n=283)

IAT scoring	[n]	%
Normal internet usage	180	63.30%
Mild IA	63	22.12%
Moderate IA	36	13.18%
Severe IA*	4	1.40%

*IA- Internet Addiction

Table No.3: Association of Internet Addiction with baseline demographic characteristics(n=283)

Factors		Internet Addiction status					p-value
		Yes		**No**			
		(n=103)	%	(n=180)	%	Total	
Gender	Male	52	41.30%	74	58.70%	126	0.3
	Female	51	32.48%	106	67.52%	157	
Accommodation	Day scholar	17	48.57 %	18	51.43%	35	0.4
	Hosteller	86	34.67%	162	65.33%	248	
Sleep hours	≤3hrs	1	33.34%	2	66.66%	3	0.1
	4-5hrs	26	47.28%	29	52.72 %	55	
	6-7hrs	59	33.72%	116	66.28 %	175	
	≥8hrs	17	34.00%	33	66.00%	50	
Physical activity per week	Nil	21	44.68%	26	55.32%	47	0.8
	1-2times	51	36.42%	89	63.58%	140	
	3-4times	15	27.77%	39	72.23%	54	
	5times and above	16	38.09%	26	61.91%	42	
Duration spent with Internet	1-3hrs	42	27.27%	112	72.73%	154	0.0001*
	4-6hrs	45	42.45%	61	57.55%	106	Significant
	7-9hrs	12	70.58%	5	29.42%	17	
	>9hrs and above	4	66.66%	2	33.34%	6	

*A statistically significant association was found between duration spent with internet and internet addiction.

Discussion

The present study focused on the problem of internet addiction. The majority of study subjects were females (55.47%). Most of them stayed in hostel (87.64%) which is comparable to the study conducted by Ranganatha S C et al[1] (58%).

In our current study, the prevalence of Internet Addiction was found to be 36.70% which is less than

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the study conducted by Jain S et al[2] (70.6%), Ade et al[3] (89.0%), Duraimurugan et al[4](56.6%) and Chaudhari et al[5](58.7%). In the present study, mild, moderate and severe addiction were found to be 22.12%, 13.18% and 1.40% respectively which is less than the study conducted by Jain S et al[2] (38.4%, 29.6% and 2.58%), Ade et al[3] (64.0%, 22.0%, and 6.0%).

Gender difference was observed in the present study, where the prevalence of internet addiction was found to be slightly more in males(41.30%) than females (32.48%), which is similar to the study conducted by Jain S et al[2] (male -74.7%, female - 65.5%) and Ranganatha S C et al[1] (male - 45%, female - 55%). On the contrary, the study done by Ade et al[3], no gender difference was found. No statistical association was found between gender and internet addiction which is similar to the study conducted by Jain S et al[2], Ranganatha S C et al[1], Setty et al[6].

Internet Addiction among day scholar (48.57%) was observed to be apparently more compared to the hostellers (34.67%), which is similar to the study conducted by Ranganatha S C et al[1] (day scholar - 52%, Hosteller – 48%), but no statistically significant association was found between accommodation and Internet Addiction which is in contradiction to the study by Ranganatha S C et al[1], Chaudhari et al[5] where statistical significance was found.

Among the Internet addicts, duration spent with internet in hours per day, majority of them used for 4-6hrs (42.45%) which is similar to the study conducted by Ranganatha S C et al[1](50%). A statistically significant association was found between duration spent with internet and internet addiction which is similar to the study by Jain S et al[2].

Conclusion

Internet addiction is an emerging problem of modern era, which has an impact on mental health. It is need of the hour for early recognition of internet addiction and thereby takes appropriate measures to manage and reduce it.

Conflict of Interest: None

Ethical clearance: Obtained

References

1. Telecom at a glance. Department of telecommunications: Ministry of Communication, government of India. Available: https://dot.gov.in/ telecom-glance (accessed on 22/10/22)

2. Ranganatha SC, Usha S. Prevalence and pattern of internet addiction among medical students, Bengaluru. Int J Community Med Public Health 2017;4: 4680-4.

3. Jain S, Agarwal V, Garg SK. Internet Addiction among Undergraduate Students of a Medical College in North India. J Med Acad 2020;3(1):14–16.

4. Ade D, Khare A, Kayande S. Study of internet addiction in undergraduate medical students. IOSR J Dent Med Sci 2018;17(3):51–55.

5. Paul AVR, Ganapathi CK, Duraimurugan M et al. Internet addiction and associated factors: a study among college students in South India. IJMHS 2015;5(3):121–125.

6. Chaudhari B, Menon P, Saldanha D et al. Internet addiction and its determinants among medical students. Ind J Psychiatry2015;24(2):158–162.

7. Setty SKC, Rani SK, Usha LVR. A Cross SectionalStudy of Internet Addiction in UndergraduateMedical Students. IOSR J Dental Med Sci.2015;14(12):108-11.

8. Patel MV, Patel N et al. A Cross-Sectional Study of Internet Addiction amongst Undergraduate Students of Medical Institute of Vadodara City. Nat J Community Med 2018;9(11):819-823.

9. Innocent BM, Leyar1 BJ, Kongo A, Mkombe C,KyandoE, George J. Internet addiction and associated factorsamong medical and allied health sciencesstudents in Northern Tanzania: a cross-sectional study. BMC Psychology (2020) 8:73.

10. Haroon MZ, Zeb Z, Javed Z, Awan Z, Aftab Z, Talat W. Internet addiction in medical students. J Ayub Med Coll Abbottabad 2018;30(4 Suppl 1):659–63.

11. Malviya A, Dixit S, Shukla H, Mishra A,Jain A, Tripathi A. A Study to EvaluateInternet Addiction Disorder amongStudents of a Medical College and Associated Hospital of Central India. Nat JCommunity Med 2014; 5(1): 93-95.

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